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FLORA OF PERU

BY

J. FRANCIS MACBRIDE

CURATOR, PERUVIAN BOTANY

JUL 23 1962

BOTANICAL SERIES
FIELD MUSEUM OF NATURAL HISTORY
VOLUME XIII, PART V-B, NUMBER 1
MAY 11, 1962

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Library of Congress Catalog Card Number: 36–10426

PRINTED IN THE UNITED STATES OF AMERICA
BY CHICAGO NATURAL HISTORY MUSEUM PRESS

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Biology

FLORA OF PERU

J. Francis Macbride

SOLANACEAE (Juss.) Lindl.

Herbaceous or ligneous, occasionally arborescent but various in habit. Leaves alternate but often geminate and then usually unequal, rarely pseudo-opposite or verticillate, simple or rarely pinnate, or even bipinnate. Flowers solitary to many, often disposed in cymes (one way or another modified), hermaphrodite, infrequently zygomorphic. Sepals commonly persisting, rather often accrescent. Corolla rotate to tubular, rarely bilabiate, ordinarily 5-merous, aestivation exceptionally imbricate, generally plicate, now and then convolute. Hypogynous torus seldom lacking. Ovary 2 (–5) -celled, ovules generally anatropous. Stamens on tube, alternate with lobes, didymous in one section only. Fruit indehiscent or dehiscent, dry to very wet, the seeds usually many.

Seven groups indicating presumed relationships according to Bentham and Hooker f., Wettstein, and, recently, Sleumer (Lilloa 23: 118. 1950) have been defined as to basic character in the generic key. To avoid dependence on the not readily observed character of the embryo, that of aestivation (it too not always discernible) has been used as a supplementary key-aid; much remains to be done on the classification, as corolla form and calyx accrescence both occur in many degrees and are in themselves of questionable significance.

1962
Sleumer

Charles Baehni in 1946 (Candollea 10: 399–494) recorded his observations on the opening of Solanaceous flower buds.

Vassobia dichotoma (Rusby) Bitter, Repert. Sp. Nov. 15: 150. 1917 (*Cyphomandra dichotoma* Rusby, Mem. Torrey Bot. Club 4: 231. 1895), with detailed description (type from Yungas, Bolivia, *Bang 519*), and also *Coranitales* by Hertzog, if found is, fide Sleumer, near *Dunalia* but has flowers apically fascicled; Rusby's description notes a terminal inflorescence, laxly fasciculate but composite, 1.5–2 dm. long and wide, corolla 10–14 mm. long, 16 mm. wide, purple, anthers subsessile, berry ellipsoid, 3–4 mm. long on pedicels at least 2 cm. long; probably *V. atropioides* Rusby, Bull. N. Y. Bot. Gard. 4: 422. 1907, is the same.

Stamens 5 and all fertile (abnormally 1 reduced).

Aestivation of corolla lobes more or less imbricate; embryo strongly curved except *Markea* and *Juanulloa*.

Corolla small; branched, often spiny shrubs (Atropeae).

Fruit drupaceous, with 4 nutlets; leaves usually subrotund. 1. *Grabowskia*.

Fruit berry-like, often 8-seeded; leaves usually narrow. 2. *Lycium*.

Corolla elongate, contracted or ampliate apically; subsimple shrubs or half-shrubs, often subscandent (Cestrinae).

Corolla amplification continuous.....16. *Markea*.

Corolla usually contracted at apex.....17. *Juanulloa*.

Aestivation valvate or induplicate-valvate, limb sometimes subequally plicate; embryo strongly curved; fruit usually a succulent berry (Solaneae).

Anther dehiscence by apical pores, cells sometimes joined, extended.

Connective of anther cells slender or not gibbous. 27. *Solanum*.

Connective of anther cells stout, more or less gibbous dorsally. 4. *Cyphomandra*.

Anther dehiscence longitudinal, sometimes early by chinks, finally to base or nearly (cf. *Solanum Pennellii*, *S. lycopersicoides* and section *Lycopersicum*), anther cells extended.

Calyx clearly accrescent in fruit, growth even early apparent.

Calyx appressed, not inflated nor costate or obscurely.

Flowers rotate or applanate-complanate, fasciculate. 5. *Withania*.

Flowers funnelform, dilated. Section *Iochroma* in 9. *Dunalia*.

Calyx inflated or lax; fruit included, rarely visible between lobes (cf. *Juanulloa*).

Flowers usually fasciculate, narrowly and deeply lobed. 5. *Withania*.

Flowers single or geminate.

Ovary 2-celled; calyx not or little alately angled; plants often pubescent.

Corolla rotate or applanate-campanulate. 6. *Physalis*.

Corolla tubular-campanulate or broadly funnelform. 7. *Cacabus.*

Ovary 3–5-celled; calyx alately angled; plants glabrate (Nicandreae).....3. *Nicandra.*

Calyx more or less spreading; fruit exserted.

Corolla applanate-campanulate. 8. (*Hebecladus*) *Saracha.*

Corolla tubular-funnelform.....9. *Dunalia.*

Calyx not at all or scarcely accrescent even below mature fruit, in *Datura* caducous, partly persisting or circumscissile and base somewhat accrescent.

Corolla tube well-developed or corolla funnelform or large, openly campanulate; stamens often longer than tube; leaves never imbricate.

Ovary 2-celled; calyx not elongate-tubular, 5-denticulate, truncate or cleft.

Calyx truncate or early subevenly 5-denticulate; corolla more or less tubular or funnelform. 9. *Dunalia.*

Calyx unevenly, rarely shortly, and medially 5–6-cleft; corolla campanulate.....10. *Poecilochroma.*

Calyx cleft, often nearly to base.

Leaves entire.....11. *Salpichroa.*

Leaves not entire.....12. *Jaborosa.*

Ovary pseudo-4-celled by placentae; calyx long-tubular, sometimes spathaceous (Datureae).....15. *Datura.*

Corolla rotate or short-campanulate; stamens not or scarcely longer or leaves imbricate (Solaneae).

Leaves simple; flowers 1–few, or rarely many and fasciculate.

Leaves imbricate; stamens exserted..13. *Witheringia.*

Leaves never imbricate; stamens not or little exserted. 14. *Capsicum.*

Leaves compound; flowers often in cymes, corymbs or racemes; anther dehiscence rarely or tardily longitudinal, a few species, mostly section *Lycopersicum.* 27. *Solanum.*

Aestivation of corolla lobes plicate, induplicate-valvate or imbricate; embryo straight or somewhat curved; (known) fruit cap-

sular, baccate or a berry but often nearly dry (cf. *Datura*), (Cestrinae).

Corolla lobes equal, imbricate, tube ampliate; scandent or lax, flowers few; calyx often enclosing fruit. 17. *Juanulloa*, 16. *Markea*.

Corolla lobes unequal or induplicate-valvate, tube slender; erect or low half-shrubs or herbs; fruit exserted.

Flowers usually many in each inflorescence.

Seeds usually few; fruit indehiscent or valvate, often tardily; shrubs or trees.....18. *Cestrum*.

Seeds usually many; herbs, often in Peru tall, subligneous or rarely ligneous.....19. *Nicotiana*.

Flowers solitary, terminal or lateral.

Leaves minute, closely imbricate.....20. *Fabiana*.

Leaves not minute, lax if crowded.....21. *Nierembergia*.

Stamens 2–4 fertile, always unequal (Salpiglossidae).

Herbs or ligneous below in age; corolla bilabiate at least slightly.

Annual or becoming half-shrubs; corolla yellow or greenish or white with yellow center.

Corolla tube ampliate.....22. *Salpiglossis*.

Corolla tube (Peru) subfiliform.....23. *Schwenkia*.

Annuals, evanescent; corolla blue or purple, rarely white. 24. *Browallia*.

Shrubs or trees.

Leaves rugose; corolla tube spiralled.....25. *Streptosolen*.

Leaves not rugose; corolla tube straight.....26. *Brunfelsia*.

1. GRABOWSKIA Schlecht.

Shrubby plants with stout rigid axillary spines and fleshy or firm rotund leaves, similar in habit to some Lyciums but the bony 2-celled fruit with 4 stones or nutlets (pyrenes), these 1–2-seeded.—Bitter, Bot. Jahrb. 54, Beibl. 119. 17. 1916, described the fruit as a drupe instead of a berry because of the stony concretion about the seeds except at base, this with 3 teeth (L'Héritier).

Grabowskia boerhaaviaefolia (L. f.) Schlecht. Linnaea 7: 71. 1832. *Lycium boerhaaviaefolium* L. f. Suppl. 150. 1781. *L. hetero-*

phyllum Murr. Comm. Goett. 6, *pl. 2.* 1783. *Ehretia halimifolia* L'Hér. Stirp. Nov. 45, *pl. 23.* 1785.

A glaucous-leaved orange-berried shrub with arching branches (Svenson), the leaves ovate to subrotund, often shortly acuminate, 1.5–3.5 (4) cm. wide; flowers in short corymbs or panicles, violet or white with yellowish or green veins in the pubescent throat; calyx subtruncate, acutely 5-denticulate, 4 mm. long; corolla, with reflexing lobes, about 10 mm. long; stamens exserted; fruit 7–8 mm. long. —According to Oscar Haught this curious endemic shrub (1–3 meters high) is a common and characteristic plant of the coast of Piura; generally in the northern desert region (Weberbauer, 106; 153; 161). Dammer, Bot. Jahrb. 50, Beibl. 111. 52. 1913, reported *Weberbauer 3783* as the first record outside of cultivation; it was grown at Paris from seeds sent by Joseph Jussieu (Lamarck Encycl. 3: 510. 1791); perhaps *Lycium salsum* R. & P. from Lima was cultivated, if, as possible, it is the same. Illustrated, Miers, Ill. S. Am. Pl.

Piura: Parinas Valley, *Haught 79.* Near Hacienda Ñomala, *Weberbauer 5945; 153.* Nigritos, (*Haught & Svenson 11609*). Talara, *Haught 15* (det. Weberbauer); *Johnston 3506.*—Cajamarca: Tembladera, 400 meters, *Weberbauer 3783.*—Lima: In rocks, Chosica, *486; Nuñez 1870; Soukup 3797.* Fifth km. east of Lima, *Goodspeed 33085.* Galapagos. "Gabonilla."

2. LYCIUM L.

Reference: C. L. Hitchcock, Ann. Mo. Bot. Gard. 19: 179–374. 1932.

Peruvian species spiny shrubs with small, often fascicled leaves and 1–several axillary narrowly funnelform flowers, the lobes imbricate in bud. Filaments unappendaged, sometimes pubescent at base or ciliate-glandular, usually inserted below the middle of the corolla, this often pubescent within toward base. Ovary 2-celled, the 2 carpels usually undivided, the more or less berry-like fruit 1–many seeded. Embryo curved, at least nearly half-turned.

Calyx lobes at least two-thirds as long as tube or 2 mm. long or longer, the lobes equal.

Corolla glabrate without, but lobes usually ciliate. . . . *L. fragosum.*

Corolla slightly pubescent toward base. . . . . *L. distichum.*

Calyx lobes less than two-thirds as long as tube, usually shorter than 2 mm., often unevenly cleft and somewhat 2-lipped. *L. nodosum.*

Lycium distichum Meyen, Reise 1: 448. 1834; 263. *Grabowskia disticha* (Meyen) Nees ex DC. Prodr. 13, pt. 1: 527. 1852. *L. oreophilum* Wedd. Choris And. 2: 108. 1857. *L. leiostemum* Wedd. l.c. *L. divaricatum* Rusby, Bull. N. Y. Bot. Gard. 8: 117. 1912.

An open much-branched shrub, the branches or branchlets more or less elongate, early densely cinereous pubescent, mostly at least the young shoots apically armed with slender sharp spines; leaves oblong-ovate to obovate or linear-spathulate, rounded to acute, puberulent and glandular-tomentulose, 4–12 mm. long, 1–3 mm. wide, those at base of branches commonly ovate, single or geminate, the younger upper narrower, 1–3-fasciculate, the old nodes enlarged; pedicels solitary at nodes 3–7 mm. long; calyx campanulate, 3–4 mm. long, sparsely pubescent, the lanceolate acute ciliolate lobes subequaling the tube; corolla obconic-tubular, the tubular portion 11–13 mm. long, about 3 mm. across at apex, 1.5–3 mm. at base, more or less pubescent near calyx lobes, the (4) 5 rounded lobes glabrous, about 1.5 mm. long; filaments subequal, adnate below middle of tube and pilose for 2 mm. above the adnate portion, the corolla tube pubescent also for 4 mm. below this free portion especially along the vascular traces of the filament (Hitchcock), or filaments and corolla tube glabrous or with 1 or 2 trichomes within (*L. leiostemum*) or the stamens inserted above the middle of the corolla (*L. oreophilum*); style equaling stamens, stigma nearly 1 mm. broad; berry reddish-purple, 6–10 seeded.—Corolla white except lavender limb (Worth & Morrison). According to Hitchcock (from whom the synonymy is taken), l.c., Nees wrote *L.* (*Grabowskia*) *distichum* (Meyen) Nees, Nov. Act. Acad. Caes. Leop. 19, Suppl. 1: 389. 1843. Hitchcock, l.c. 265, has carefully observed the apparent differences, at least ex char. between the types of Weddell and Meyen but the problem can scarcely be solved until more collections are available. Illustrated, Hitchcock, *pl. 16, fig. 26*. F.M. Neg. 2461.

Cuzco: Lahumarmaqui, Urubamba, *Vargas 7865; Gay* (type, *L. leiostemum*, Paris).—Arequipa: Mollendo, *Weberbauer 1520* (ex char. *L. leiostemum*); *Worth & Morrison 15768* (probably but calyx not typical); Pampa La Joya, *Ferreyra 6425*.—Puno: Yura, (*Williams 2554*, type, *L. divaricatum*, New York).—Tacna: Cordillera de Palca, *Weddell* (type, *L. oreophilum*, Paris). Cordillera Tacna, 2000 meters, *Meyen* (type, Berlin).

Lycium fragosum Miers, Ann. Mag. Nat. Hist. 2, 14: 132. 1854; 266.

Resembles *L. distichum;* leaves linear to spatulate, 2–15 mm. long, 0.5–1.25 mm. wide, densely hirtellous-puberulent, 3–8-fasciculate, frequently revolute; calyx 2.5–3.5 mm. long, the 4 lobes nearly as long as the tube; corolla glabrous without, the 4 oval lobes 1–1.5 mm. long; filaments adnate medially or less, pilose the first 2–3 mm. of their free portion, the tube also slightly pubescent adjacent to and below the free portion; style 1–2 mm. shorter than stamens.—As suggested by the monographer himself the type of Miers should probably be included within the probable variation range of *L. distichum* Meyen; it was treated as a variant of *L. salsum* R. & P. (that is, *L. nodosum*) by Terraciano, Malpighia 4: 530. 1891. Type *Cuming 948* bears data in British Museum "Cobija, Iquiqui et Arica," (Hitchcock) and of course possibly extends into adjacent Peru. Illustrated, Hitchcock, 358, *pl. 16, figs. 10–12* (flowers).

Peru (see note above). Chile.

Lycium nodosum Miers, Ann. Mag. Nat. Hist. 2, 14: 139. 1854; 221. *L. salsum* R. & P. Fl. Peruv. 2: 46, *pl. 183a.* 1799, not Bartram, 1792. *L. Tweedianum* Griseb. Abh. Konig. Ges. Wiss. Got. 19: 216. 1874, fide Barkley, Lilloa 26: 206. 1953. *Citharexylum flexuosum* D. Don, var. *subglabrum* Mold. Repert. Sp. Nov. 137: 222. 1937. *L. subglabrum* Mold. Phytologia 4: 292. 1953; 6: 353. 1958?

Much-branched shrub with a few short spines and often with prominent white-pilose or -puberulent nodal (and even spinal) short shoots; stems gray, brown in age, glabrate; leaves obovate-spatulate, or obovate and rounded-obtuse to linear-elliptic and subovate, glabrous, 4–40 mm. long, (2) 3–11 mm. wide, cuneate and decurrent into petiole 4–13 mm. long; flowers 1–3 at nodes, pedicels 3–13 mm. long, glabrous as calyx (unless lobes), this with cupulate tube 13 mm. long, 2 lips 2–3 mm. long and lobes 0.5–1.5 mm. long or not 2-lipped, the lobes then 0.4–1.5 mm. long, broadly triangular, subciliate to ciliate; corolla densely pilose within, around or between stamen insertion, the tube 4–7 mm. long, the lobes 2–5 mm. long, 2–2.5 mm. broad, usually ciliate; stamens exserted, attached 2–5.5 mm. above base of tube, filaments more or less pilose, style 8–9 mm. long; fruit spherical, red, 3–5 mm. thick.—Description and synonyms by Barkley, who decided that *L. nodosum* and *L. Tweedianum* as delimited by Hitchcock represent the two extremes of a very variable species; Svenson, Amer. Journ. Bot. 33: 483. 1946, noted some variation in size of flower parts in Ecuadorian plants in contrast to those from Argentina, both forms or variants however described as having green

flowers and rounded obtuse fruit while the plant from Lima ex char. has pale reddish to deep lavender corolla, viscous elongate reflexed lobes and very elongated and pointed fruit. Accordingly, more investigation may show that *L. nodosum* Miers, also of Argentina, is not the same as *L. salsum* R. & P., in which case the latter apparently will require a new name. The native name signifying a salty spine refers to the taste of the leaves (Ruiz & Pavón). Illustrated, Miers, Ill. S. Amer. Pl. 2: 115, *pl. 69a;* page 131, *pl. 72c* (*L. salsum*); Hitchcock, 356, *figs. 16–18; figs. 1–3* (*L. Tweedianum*).

Lima: San Juan de Chicla, (*Anderson*). Río Blanco, *Killip & Smith 21679* (det. Moldenke, *L. subglabrum*). Lurín, (*Mathews 450*); *Ruiz & Pavón,* (type, *L. salsum*). Matucana, *2885* (fide Moldenke is *L. subglabrum*). Near Lima, *Wilkes Exped.; Nation.* San Augustín, *Weberbauer 5226.* Argentina and Paraguay, coastal Ecuador, Colombia to Venezuela (Barkley). "Cachicasa."

3. **NICANDRA** Adans. Apple of Peru

Calydermos R. & P. Fl. Peruv. 2: 43. 1799.

A smooth or nearly smooth annual with ovate sinuate-toothed leaves and solitary peduncled rather large blue or lavender flowers. Calyx enlarged and bladder-like as in *Physalis* but the thin-walled yellow berry 3–5-celled and nearly or quite dry.—The often irregularly serrate leaves distinguish it in flower from *Saracha* species in Peru; in fruit of course the accrescent calyx differentiates it from *Physalis;* in flower it is marked by the showy blossom. Wettstein isolated this as a subgroup, showing that the ovules are borne on unevenly lobulate placentae (Pflanzenfam. IV, Abt. 3: 11, *fig. 5.* 1895). Practically, in floristic work, it must be keyed in relationship to *Physalis* L. which it so closely resembles.

Could be a poet's inspiration, in flower or fruit; indeed, named for one, Nicander of Colophon, Ionia (Asia Minor).

Nicandra Physalodes (L.) Gaertn. Fruct. 2: 237. 1791. *Atropa physalodes* L. Sp. Pl. 181. 1753. *Physalis datura(e)folia* Lam. Dict. 2: 102. 1786. *C. erosus* R. & P. l.c. *Physalodes peruviana* [Mill.] Ktze. Rev. Gen. 452. 1891.

A common bushy plant of dryer, usually disturbed soils (Weberbauer, 106; 107). Native to Peru, it has long been grown for ornament and now and then persists after cultivation.

Cajamarca: San Miguel, *Ferreyra 7080; 5308;* Weberbauer, 188.—La Libertad: Chicama Valley, *Smyth 35; 52* (det. Killip).—Lima: Along Río Chillón, *Pennell 14471.* Huara, *Soukup 1004.* Matucana, *295.* Surco, *Nuñez 2687.* Above Lima, (Weberbauer, 166); (*Ruiz & Pavón*).—Huánuco: *2041; Pavón; Stork & Horton 9365.*—Apurímac: Pachachaca Valley, *Goodspeed Exped. 10565.*—Cuzco: Anta, *Vargas 198.* Valle de San Miguel, *Herrera 1990.* Torontoi, *Cook & Gilbert 822.*—Arequipa: Mejia, (*Günther & Buchtien 108*). "Capuli cimarron," "ccarapamacmam," "jarrito," "orzita de pellejo," "toccoro."

The genus *Solanum*, which usually would be treated at this point, has been placed at the end of the family. (*Ed.*)

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4. CYPHOMANDRA Mart.

Pionandra Miers in Hook. Lond. Journ. Bot. 4: 358. 1845. *Cyathostyles* Schott ex Meissn. Gen. Comm. 184. 1840, *nomen nudum.*

Reference: Dunal in DC. Prodr. 13, pt. 1: 387, 402. 1852.

Shrub or small trees with entire, lobed, or pinnately divided leaves; distinguished from *Solanum* chiefly by the more or less dorsally thickened (gibbous) connective of the anthers. Leaves, especially when entire, usually somewhat cordate, often obliquely. Fruit ovoid or oblong, many-seeded, sometimes large.

This segregate or expedient genus, while not always clearly defined, usually, at least in Peru, has a distinctive facies either because of the leaves, the subsimple or remotely branching and elongating inflorescence, the often large fruits (edible when cooked), or a combination of these characteristics. *Solanum incurvum* R. & P. was referred here by Werdermann in Herb. Madrid.

As most groups in this family—at least in Peru as so many others—this requires revision by a qualified taxonomist with time and means for the prolonged research necessary to even partial understanding of specific relationships; as usual, recently proposed species may prove to be the same as Amazonian ones.

KEY TO CYPHOMANDRA

Leaves more or less obliquely cordate at base (if obscurely, indument somewhat glandular), or not entire, often broadly ovate.

Leaves entire (herbarium material seen), obtusely or acutely acuminate or cuspidate.

Leaves puberulent at least veins beneath; corolla segments ovate-lanceolate.

Leaves uniformly pulverulent or finely puberulent beneath. *C. crassifolia.*

Leaves puberulent on the veins beneath (type) . . . . *C. obliqua.*

Leaves quite glabrous at least beneath, where papillose; corolla segments lanceolate or sublinear.

Corolla segments lanceolate.

Anthers linear-oblong . . . . . *C. splendens, C. coriacea.*

Anthers broader . . . . . *C. obliqua.*

Corolla segments sublinear . . . . . *C. endopogon.*

Leaves, lobes or divisions (these present, at least in some leaves) acutely and narrowly caudate-acuminate or/and pubescent.

Branchlets as leaves, at least on nerves, shortly pubescent, rarely hirsutulous, some trichomes gland-tipped unless *C. viridiflora.*

Corolla purplish, more or less puberulent . *C. Ulei, C. pendula.*

Corolla green, lobes lanate marginally . . . . . *C. viridiflora.*

Branchlets as often leaves long-setose; leaves (in part, type) 3-lobed . . . . . *C. tenuisetosa.*

Leaves acute or more or less rounded or if oblique at base, rather oblong-elliptic; indument lax, eglandular . . . . . *S. incurvum.*

Cyphomandra crassifolia (Ortega) Kuntze, Rev. Gen. 3, pt. 2: 220. 1898; 393. *Solanum crassifolium* Ortega, Dec. 9. 117. 1797. *S. betacea* Cav. Icon. 6: 15, *pl. 524.* 1801. *C. betacea* (Cav.) Sendt. Flora 28: 172, *pl. 6.* 1845. *C. betacea* (Cav.) Sendt., var. *velutina* Dunal in DC. Prodr. 13, pt. 1: 394. 1852?

A small tree usually about 3 meters high with ample fleshy cordate-ovate long-petioled (2–3 cm.) leaves, softly pubescent at least beneath, and more or less pendulous waxy pink-tinted glabrous flowers; cymes simple, bifid or trifid, lateral or axillary, subequaling the often reddish-violet petioles; calyx subcampanulate, semi-parted, the broadly ovate subacute segments thicker and accrescent in fruit; corolla rotate-campanulate, to 12 mm. long, the lanceolate concave segments ciliolate, apically reflexed; stamens about 6 mm. long,

short filaments terete, anthers oblong, 5 mm. long, minute apical pores slightly inflexed, the fleshy connective linear-oblong, rounded at base, not calloused; ovary conical, style subcylindric, somewhat incrassate to the small glandular stigma; fruit egg-shaped, to about 5 cm. long, maturing reddish- or brownish-yellow.—Apparently known in Peru only in cultivation. Miers, Hook. Lond. Journ. 4: 359. 1845, records finding it "in the markets of Lima where it is commonly used for cooking in lieu of the ordinary tomate, the flavour of which it greatly resembles." In central Peru it is not unusual to find one or two trees near dwellings. According to Herrera it is used in making "dulces."

Amazonas: Near Chachapoyas, *Ferreyra 7109*.—San Martín: Juanjuí, *Klug 4192*.—Huánuco: Tingo María, *Stork & Horton 9559*. Puente Durand, *Mexia 8235*. Near Muña, *3875*.—Loreto: Yurimaguas, *Williams 4198*. Río Nanay, *Williams 391*. Contamana, *Killip & Smith 26872*. La Victoria, *Williams 2615; 2827; 3021*.—Ayacucho: *Weberbauer 5494* (det. Bitter).—Cuzco: La Maquina, *West 8044*. Pomontama, *Herrera 2984*. Machupicchu, *Ferreyra 2708*. Ollantaitambo, *Cook & Gilbert 770*. Torontoi, *Cook & Gilbert 1101*. Without locality, (*Pavón*). South America. "Tomate," "tomate de la Paz," "pimiento," "tomate del Campo," "gallinazo panga" (Williams); "berenjena" (Ferreyra).

Cyphomandra coriacea (Miers) Dunal in DC. Prodr. 13, pt. 1: 401. 1852. *Pionandra coriacea* Miers in Hook. Lond. Journ. Bot. 4: 363. 1845.

A shrub with very heavy coriaceous glabrous ovate-cordate leaves (petioles 5 cm. long), the larger often more than 1.5 dm. long, at least 1 dm. wide, the smaller more than half as large; petiole and basal leaf-lobes subequal; flowers secund in short racemes, the crowded pedicels articulate; corolla-tube short, the divisions lanceolate; anthers linear, erect, the connective fleshy.—Apparently this is the earlier name for *C. splendens* Dunal of Ecuador but it was imperfectly or incompletely described.

Amazonas: (*Mathews 1971*, type).

Cyphomandra endopogon Bitter, Bot. Jahrb. 54, Beibl. 119: 16. 1916.

A small glabrous (except flowers) tree to 7 meters tall; leaves alternate or geminate, unequal, lustrous both sides, entire, subcoriaceous, broadly or obliquely ovate-cordate, the larger 1.5 dm.

long or longer, about two-thirds as wide, the smaller often only half as large or less; petioles 2–7.5 cm. long; inflorescence greatly elongating, usually forking, many- (often 30–50) flowered, the peduncle 5 cm. long or longer; calyx 2 mm. long, 5 mm. across, the obtuse lobes marginally puberulent, the open corolla greenish (early pale violet), rotate-stellate, 3.5–4 cm. wide, deeply lobed, the segments 16–18 mm. long, to 2 mm. wide or little wider, pilosulous especially toward apex or marginally; stamens about 1 mm. above the base, anthers lanceolate, about 9 mm. long, the prominent connective densely papillose, the anthers shortly; ovary as style glabrous, both 9 mm. long, the stigma lobed, 2.5 mm. broad.—When *C. coriacea* (Miers) Dunal and *C. splendens* Dunal are better known one instead of two or three species may be found, in reality. F.M. Neg. 2932.

San Martín: San Roque, *Williams 6939*. Near Juanjuí, *Ferreyra 4407*.—Huánuco: Valley of the Río Mayro, from the Río Palcazu, *Weberbauer 6757*, type. Tingo María, *Ferreyra 959*.—Loreto: Middle Río Blanco, *Tessmann 3506* (det. Werdermann). Yurimaguas, *Killip & Smith 28182*. Near Iquitos, *Klug 2560* (det. Standley); *Killip & Smith 29863; Williams 3716*. La Victoria, *Williams 2564; 2917*.

Solanum incurvum R. & P. Fl. Peruv. 2: 34, *pl. 164*. (115?) 1799; 155. *S. recurvum* Poir. Encycl. Suppl. 3: 754. 1814.

Stems glabrous, angled, nodosely articulate, to 2 meters high; leaves ovate-acuminate, rounded, acute at the little inequilateral base, the largest seen 13 cm. long, 6 cm. wide, long-petioled (petioles hirsute, 5–6 cm. long), shortly crisply pubescent on both sides, probably glabrate in age, venose beneath; racemes axillary, geminate, bifid; pedicels hirsute, incurved, violet-tinged, about 1.5 cm. long, rusty viscid-pilose as the calyx and young leaves; calyx campanulate, truncate, minutely dentate, 3 mm. deep; corolla pale violet, three times longer than the calyx, or the segments 8 mm. long, acutish.—Flowering stem apparently subherbaceous in type but recent collections are shrubs, open in growth; my *4491*, in young fruit except for two flowers, is somewhat doubtful as to true character of stamens; the inflorescences are binate, peduncles to 5 cm. long, pedicels to 3 cm. long, corolla 1 cm. long, lanate without, young berries ellipsoid, apiculate; its habit suggests *Solanum* and indeed it was placed by Bitter in his subgroup *Bassovioides* but its facies is that of *S. hederiradiculum* Bitter and the berries suggest *S. conicum* R. & P. or one

of its relatives, so I have avoided using the implied transfer of Werdermann in herb. Madrid to *Cyphomandra*.

Huánuco: Muña, *Ruiz & Pavón*, type. Playapampa, *4491?*—Ayacucho: Choimacota Valley, 2,800 meters, *Weberbauer 7370*.

Cyphomandra obliqua (R. & P.) Sendt. Flora 28: 172. 1845; 393. *Solanum obliquum* R. & P. Fl. Peruv. 2: 35, *pl. 165, fig. a.* 1799. *Pionandra obliqua* (R. & P.) Miers in Hook. Lond. Journ. Bot. 4: 359. 1845.

Stems and leaf-nerves typically minutely puberulent above and below; leaves very oblique at the cordate base, acuminate, 1.5–2 dm. long, 8–12 cm. wide; flowering pedicels 5 mm. long; calyx poculiform, 4–6 mm. long and broad, obtusely 5-denticulate (type); flowers 8 mm. long, 2 cm. across, segments lanceolate, acute, purple-violet, including the connivent anthers; berries "oblong," apparently small. —Leaves strongly oblique; stigma (figure) bifid. The Schunke and Klug specimens have quite entire calyces (suggesting those of the Colombian *C. naranjilla* Pittier, Contr. U. S. Nat. Herb. 13: 117. 1910); the Klug specimens have glabrous membranous leaves; cf. also *C. splendens*. F.M. Neg. 12993.

San Martín: Tarapoto, *Spruce 4229?*—Huánuco: Chinchao, Hacienda San Carlo, *Stork & Horton* (det. Morton, with query).—Loreto: Río Mazán, *José Schunke 357* (det. *C. crassifolia?*, Standley). Near Iquitos, *Klug 484*.

Cyphomandra pendula (R. & P.) Sendt. Flora 28: 173, *pl. 7.* 1845; 395. *Solanum pendulum* R. & P. Fl. Peruv. 2: 39, *pl. 174, fig. a.* 1799. *Pionandra pendula* (R. & P.) Miers in Hook. Lond. Journ. Bot. 4: 359. 1845.

A soft woody, single-stemmed glabrate or hirsute-pubescent and unpleasantly scented plant to 6 meters high, branched only at the summit; petioles to 2 dm. long, 1 cm. thick; leaves in type ternate, but also simple or 2–11-pinnatifid, often 5–8 dm. long, 5 dm. wide, the lowest leaflets petiolulate, the ovate-cordate segments entire, oblique at base, acuminate, densely or sparsely pubescent with simple trichomes especially beneath; peduncles from the axils of the branches forking remotely and greatly elongating; pedicels about 1 cm. long; calyx-divisions rotund, subtruncate, medially apiculate; corolla 1.5–2 cm. long, rather funnelform, purplish, 4 times longer than the calyx; lobes lanceolate, acute, reflexed apically; anthers ventricose, erect; fruit large, yellow, at maturity as large as an egg.—Werdermann leaves this in *Solanum* in Herb. Madrid, and the con-

nective, while broad, is scarcely thickened; it seems to me that Martius' genus should be more narrowly restricted, if retained. A species of low woods. F.M. Negs. 2936; 12995.

Huánuco: Puente Durand, *Mexia 8245*. Huacachi, near Muña, *4141; Weberbauer 6720*. Prov. of Panatahuarum, especially at Muña, *Ruiz & Pavón*.—Loreto: Paca, on the Ucayali, (*Huber 1569*). —Cuzco: Anta, *Vargas 200*. "Púruma," "papaya del monte."

Cyphomandra splendens Dunal in DC. Prodr. 13, pt. 1: 395. 1852.

Nearly glabrous, the type with vivid brownish-purple half-climbing branches, the distinctly and unequally cordate-based acuminate leaves intensely green above; petioles sulcate, to about 4 cm. long; leaves geminate, nerved from base, reticulate-veined, rather fleshy, sparsely punctiform puberulent above, minutely papillose beneath, the larger 12–17 cm. long, usually about half as wide, the smaller sometimes only a third as large; racemes branched (always?), glabrate or pulverulent, a dm. long or longer, the basally articulate pedicels 1.5 cm. long or longer; calyx purplish, apiculately 5-crenate-dentate, 4–6 mm. across; corolla 5-parted, the narrowly lanceolate-oblong acuminate segments pubescent marginally toward apex, 10–12 mm. long; anthers 6 mm. long, connective purple, puberulent, linear-acuminate, basally dilated, gibbous; stigma obconic.—Type collection from Guayaquil as noted on Ruiz and Pavón (Tafalla) specimen in Herb. Madrid; Dunal's description from sheet in Geneva (Herb. Boissier), accredited to Peru, where it may occur under the name *C. coriacea* (Miers) Dunal. F.M. Neg. 8561.

Peru (possibly). Ecuador.

Cyphomandra tenuisetosa Bitter, Repert. Sp. Nov. 17: 352. 1921.

Type a small tree 2–5 meters high with ample diverse firm sublustrous leaves ovate-cordate and entire to deeply 3-lobed, the lateral lobes lanceolate-acuminate, the terminal rounded; pubescence in part minutely stipitate glandular but prominently on branchlets, petioles and leaves, especially above on the veins, subpatently long-setose (trichomes 2–3 mm. long); inflorescence axillary, 20–30-flowered, peduncle 5.5 cm. long; pedicels about 2 cm. long (2.5 or longer in fruit), nearly glabrous as the calyx, this broadly campanulate, 1 cm. across, the very broadly ovate lobes unequally (2 lobes broader) apiculate; corolla campanulate-stellate, lilac-blue, about 17 mm. long with a

spread of 2.3 cm., the broadly lanceolate lobes pubescent only within at the recurved tips; anthers narrowly ellipsoid, about 8 cm. long; style 9 mm. long, capitate stigma 1.5 mm. broad.—The two collections are alike as to flowers but one has simple leaves. The author suggests that the latter here as in other species may occur on young branches. Peruvian collections all show only entire leaves but may be referable here. F.M. Neg. 2937.

San Martín: Juanjuí, *Klug 3873*.—Huánuco: San Carlos, *Mexia 8209*.—Junín: Puerto Bermudez, *Killip & Smith 26605*.—Loreto: Yurimaguas, *Williams 4193; 4370; 4687; Killip & Smith 28005; 28703; 29093*.—Río Acre: In woods at Porto Carlos, *Ule 9753*, type; *Cobya 9752*. "Pepino del campo" (Mexia).

Cyphomandra Ulei Bitter, Repert. Sp. Nov. 17: 349. 1921.

A shrub 2–5 meters high, with simple, broadly or rounded ovate-cordate, shortly (velvety beneath) pubescent and somewhat stipitate-glandular firm leaves, the larger to 2 dm. long, 13 cm. wide, the smaller about 1 dm. × 8 cm.; inflorescence above the leaf axils, the indument consisting mostly of minute 2-celled glandular and eglandular trichomes, the peduncles only about 1 cm. long; pedicels to 2.5 cm. long, a little longer in fruit; calyx cupulate, 3–4 mm. long, 5 mm. wide, the obtuse lobes early obscure; corolla stellate, about 2.5 cm. wide, the lanceolate subacute lobes about 1 cm. long, finely pubescent without, with a few longer usually simple marginal trichomes, glabrous within except for the pilose tips; filaments 2.5 mm. long, anthers 4.5 mm. long, papillose; style 3.5 mm. long, subpeltate stigma nearly 2 mm. wide.—Leaves gradually narrowed to acute or subacute apex.

Loreto: Mishuyacu near Iquitos, *Klug 93*.—Apurímac: Pincos, in *Escallonia* forest, *Stork & Horton 10711*.—Cuzco: Anta, *Vargas 200* (distr. as *C. pendula*).—Río Acre: In woods at San Francisco, (*Ule 9755*, type).

Cyphomandra viridiflora (R. & P.) Sendt. Flora 28: 175. 1845; 400. *Solanum viridiflorum* R. & P. Fl. Peruv. 2: 38, *pl. 173, fig. b.* 1799. *Pionandra viridiflora* (R. & P.) Miers in Hook. Lond. Journ. Bot. 4: 359. 1845.

Stems woody, branched, about 2 meters high, the branchlets and ample (the larger 1.8 dm. × 8 cm., the smaller about 1 dm. × 7 cm.) cordate-ovate simple leaves softly villous; petioles 2.5 cm. long; pe-

duncles nearly as long as the leaves, drooping; calyx pilose, 6 mm. across, half as long, the lobes acute, erect, short; corolla green, about 1 cm. long and broad, deeply parted, the ovate-lanceolate divisions reflexed, woolly-margined; style exserted, swollen at the middle; connective scabrous; berry about 5 cm. long and 3 cm. thick, villous, yellowish; seeds lentiform, yellow.—Allied to *C. pendula* by Ruiz and Pavón, and to *C. crassifolia* by Miers; the interpretation may be incorrect.

Huánuco: San Antonio de Playagrande, *Ruiz & Pavón.*

5. WITHANIA Pauquy

Athenaea Sendt. in Mart. Fl. Bras. 6: 133. 1846. *Larnax* Miers, Ann. Mag. Nat. Hist. 2, 4: 37. 1849.

More or less ligneous, sometimes flowering as herbs, the Peruvian species with fasciculate (1–several) 5-merous campanulate-funnelform flowers, deeply lobed, the lobes reflexing. Calyx more or less inflated, minutely (Peru) dentate accrescent and closely or loosely investing the fruit.—Werdermann, Diels, Bibl. Bot. 116: 130. 1937, described *A. Bitteriana* from central Ecuador with dark purple tubular-funnelform corollas, the calyx inflated; the group therefore is probably a part of *Dunalia,* sens. lat. The names of Pauquy (1824) and Sendtner have both been conserved against earlier ones. The calyx teeth may be incurved or the calyx may be lobed, the plants when in fruit simulating *Physalis* L., from which it is most readily distinguished (arbitrarily but conveniently) by the more or less deeply lobed corolla, the lobes somewhat reflexed. Bitter found no granules in the fruits he examined. Incomplete or young specimens have been confused with *Capsicum* L.

Corolla white; leaves glabrous.....*W. peruviana.*
Corolla yellow; leaves villosulous.....*W. subtriflora.*

Withania peruviana (Zahlbr.) Macbr., comb. nov. *Athenaea peruviana* Zahlbr. Ann. Naturh. Hofm. Wien 7: 7. 1892.

Rather open in growth, the branches slender, glabrous or essentially except for the ciliate corolla lobes, these 5 mm. long; leaves oblong-elliptic-ovate, attenuate both ends, strongly oblique at base, often 1.5–2 dm. long, about a third as wide; berry orange, 10–14 mm. in diameter, deeply but loosely invested by the greatly enlarged 5-ribbed and plicate calyx.—The lax calyx seems to suggest that

Withania Pauquy at best is an expedient segregate of *Physalis* L. F.M. Neg. 2546.

Cajamarca: Tambillo, *Jelski 55; 54 (41; 60)*.—San Martín: Tarapoto, *Spruce 4443*.—Loreto: Cerro de Escaler, *Ule 6803* (det. Bitter).

Withania subtriflora (R. & P.) Dunal in DC. Prodr. 13: 455. 1852. *Physalis subtriflora* R. & P. Fl. Peruv. 2: 42, *pl. 178*. 1799. *Larnax subtriflora* (R. & P.) Miers, Ann. Mag. Nat. Hist. 2, 4: 38. 1849.

A shortly villous herb or ligneous toward base; branches, branchlets sulcate, at least in drying; petioles 0.5–1.5 cm. long; leaves in part geminate, the larger 7–10 cm. long, to 5 cm. wide, the smaller often about half as large, all ovate, more or less obliquely subcordate or rounded at base, acuminate, subvillous both sides at least on the 6–7 primary nerves and rather prominent reticulate veins; pedicels 1–5, filiform, 3 mm. long, nutant; early calyx campanulate, 4.5 mm. across, membranous, 5-nerved, truncate between the short teeth, in age suburceolate; corolla greenish-yellow, about 6 mm. long, 10–12 mm. across, often smaller, the ovate acutely acuminate lobes reflexed at tip; stamens inserted at base, filaments 3 mm. long, anthers stout, subcordate, style filiform, stigma capitate; berry yellowish, 6–8 mm. in diameter, closely enclosed in the inflated but apically open calyx.—F.M. Negs. 2544; 2547 (ined. name); 8566.

San Martín: Tarapoto, *Spruce 4125; (5522)*. Chazuta, *Klug 4111*. Zepelacio, *Klug 3667*.—Lima: Obrajillo and San Buenaventura, *Ruiz & Pavón*, type.—Huánuco: Tingo María, *Allard 21846; 21870*.—Junín: Jauja, *Weberbauer 6672*.—Loreto: La Victoria, *Williams 2847*. Pongo de Manseriche, *Mexia 6340*.

6. PHYSALIS L.

Reference: Waterfall, Rhodora 60: 107–114, 128–142, 152–173. 1958.

In Peru erect or spreading annual or perennial herbs usually low, branched and sometimes woody toward the base. Leaves entire or sinuately dentate. Peduncles solitary or rarely several on short axillary branchlets. Corolla rotate or applanate-campanulate (Sleumer), (limb exceptionally 5-parted), often yellow with a dark brown or purple center. Calyx in fruit accrescent and usually bladdery-inflated, membranous, always completely and laxly enclosing the berry, the teeth commonly connivent.—The yellow berries are called "ground-

cherries," or, in English horticulture, Cape Gooseberries. *P. chenopodifolia* Lam., Illus. 2: 28. 1793, a perennial, early white-tomentose with simple trichomes, corolla spots dark violet, anthers orange, margins violet, was described from cultivated plants, seed possibly from Peru (author); found to date only in Mexico (F.M. Neg. 29394). *P. Alkekengi* L., Sp. Pl. 183. 1753, of gardens, probably sometimes persisting as an escape, is usually unbranched and has greenish-white scarcely lobed corollas, calyx in fruit bright red, berry red, the "strawberry tomato" in English; yellow-fruited species are familiar as ground cherries, sometimes as Cape Gooseberry, all edible, especially as preserves, particularly *P. pubescens* L., the Pear Cherry (Henry Paul Jackson).

KEY TO PHYSALIS

Flowers blue (ex char.); plants somewhat stellate pubescent, rarely in part simply or nearly glabrous ..... *P. viscosa.*

Flowers yellowish or yellow; indument, if present, not conspicuously stellate, trichomes mostly or all simple.

Pilose perennial; corolla spots, anthers (3 mm. long) deep blue-purple ..... *P. peruviana.*

Puberulent, long-pilose or glabrous annuals; anthers blue, often 1.5–2.4 mm. long.

Trichomes mostly or all long, rarely none; corolla spots 5, dark; calyx pubescent, angled ..... *P. pubescens.*

Trichomes lacking or short, few; corolla spots (typical) none; calyx not angled in fruit ..... *P. angulata.*

Physalis angulata L. Sp. Pl. 183. 1753; 162. *P. Linkiana* Nees, Linnaea 6: 471. 1831. *P. lanceifolia* Nees, l.c. 473.

An essentially glabrous angular-stemmed annual several dm. to a meter high, with ovate to linear-lanceolate cuneate-based often sharply sinuate-dentate leaves and small (4–10 mm. long) cream-colored flowers not spotted but with dark centers; anthers bluish (grayish-green, Killip spec.); calyx subangulate, usually 2–3 cm. long, the recurving peduncle usually shorter; seeds rufescent.—A weedy species of wide distribution in warm countries. Determinations by Standley. The var. *lanceifolia* (Nees) Waterfall, l.c. 163, is distinguished by the oblong-lanceolate usually subentire leaves and the peduncles, 1–2 cm. long, erect in flower, elongating, recurving and

incurving or reflexed in fruit, the fruiting calyx 2–2.5 cm. long; corolla usually only 4–5 mm. long, calyx in flower 4 mm. long, anthers often only 1–1.5 mm. long.

An infusion of the entire plant (except root) is taken by the natives to cure malaria (Ferreyra).

Piura: Caña Dulce, *Haught 88*. Alto de La Cruz, *Stork & Horton 11353*. Prov. Paita, *Horton 11594*.—La Libertad: Salaverry, *Worth 8892*.—San Martín: Jepelacio, *Klug 3439*. San Roque, *Williams 7060*. Tarapoto, *Williams 6220*. Juanjuí, *Ferreyra 4537*.—Lima: Magdalena, *Neé*. Chancay, *Ruiz & Pavón; Wilkes Exped.*—Huánuco: Tingo María, *Stork & Horton 9470; Allard 21139; 22050* (det. L. Smith).—Junín: La Merced, *5361*.—Loreto: Mishuyacu, *Klug 1241?* (det. Killip, *P. Lagascae* R. & S.). Yurimaguas, *Ferreyra 4918* (det. Cowan); *Killip & Smith 28218*. Caballo-cocha, *Williams 2218; 2284*. Pucallpa, *Soukup 3032*. Iquitos, *Killip & Smith 27247*. Río Nanay, *Williams 336*. La Victoria, *Williams 2637*.—Ayacucho: Prov. Huanta, *Weberbauer 5637; Killip & Smith 23085*.—Cuzco: Río Yanamayo, *Pennell 14080*. Quellouno, *Vargas 7556*. "Bolsa mullaca" (Williams). "Cahuli Cimarron," i.e. False Capuli. Mexico.

Physalis peruviana L. Sp. Pl. ed. 2. 1670. 1763; 141. *P. edulis* Sims, Bot. Mag. *pl. 1068*. 1807.

A tall erect often densely pilose unpleasantly scented perennial from a creeping rootstock, the trichomes eglandular, simple; leaves broadly ovate-cordate or subrotund, acuminate, 5–10 cm. long, nearly as wide; corolla yellowish, dark blue-purple spotted at base, about 12 mm. long, 1.5 wide at top; filaments slender; anthers purple or purplish-red; calyx villous, teeth acuminate, subequaling the tube, about 7 mm. long, soon accrescent, finally to 4 cm. long in fruit.—Frequently cultivated in warm countries for its sweet yellow berries and so in Peru in 1725, according to Feuillée, where "greatly esteemed as a preserve." Herrera states that an infusion of the flowers is used during childbirth. C. V. Morton, U. S. National Museum, thoughtfully sent me (with many selected specimens) a photostatic copy of notes on the Cape Gooseberry (Year Book 1922, Madras Agric. Dept. 1923), an interesting account of the usefulness of the plant for its fruits; filed with it is a report on the chemistry by J. B. Lal (Proc. Ind. Nat. Acad. Sci. 6 (4): 309–313. 1936), and a copy of M. Bossin's notes on *P. edulis* Sims and other species (Bull. Mens. Soc. d'Acclìm. sér. 3, 2: 64–74. 1875). Bossin regarded *P. peruviana* L. as a different species. Finally, there is a file of correspondence

regarding this last question, highly amusing as an example of diplomatic "passing the buck," no specialist of the time accepting the responsibility of declaring surely the status of the two names; I follow suit.

Piura: Chicama, *Haught 189.* Caña Dulce, *Haught 178.*—Cajamarca: Monte Seco, *Soukup 3888.*—Lima: Prov. Huarochiri, *Goodspeed 33117* (det. Killip); *Isern 2461.*—Huánuco: San Rafael, *Ferreyra 1974.* Divisoria, Chanchamayo Valley, *Schunke 484.*—Junín: Tarma, *1041; Killip & Smith 21902.* Huancayo, at 3317 meters, *Soukup 2733* (det. Standley).—Apurímac: Prov. Abancay, *Goodspeed Exped. 10571* (det. Standley); *Balls 6837.*—Cuzco: Toward Machupicchu, *Herrera 3281; West 8023* (det. Johnston); *Soukup 126.* Pillahuata, *Pennell 13952.* Prov. Anta, *Vargas 148* (det. Standley). Paucartambo, *Herrera 3802* (det. Killip). "Capuli," "tomate sylvestre," "aguaymanto" (Vargas).

Physalis pubescens L. Sp. Pl. 183. 1753; 164. *P. pubescens* L., var. *hygrophila* (Mart.) Dunal in DC. Prodr. 13: 446. 1852. *P. hygrophila* Mart. Flora 24, Beibl. 2: 86. 1841? *P. turbinata* Medic. Act. Acad. Theod. Palat. 4: 189. 1780, fide Waterfall.

A slender generally diffuse more or less viscid-pubescent or, in var. *hygrophila,* hirsutulous annual with ovate slightly cordate leaves, subentire at least below; peduncles 3–5 (12) mm. long, to 2 cm. long in fruit; calyx teeth lanceolate, equaling the tube, the fruiting calyx 2–3 (4) cm. long, 5-angled, somewhat retuse at base; corolla yellow with prominent ribs or spots, 6–10 mm. long; anthers 1.5–2.4 mm. long, usually violet.—The var. *glabra* (Michx.) Waterfall, l.c. 165, is at most only puberulent.

The yellow bittersweet berries, as those of *P. peruviana,* are used for preserves and are said to be sweeter; cultivated, according to Ruiz and Pavón, for the acid-sweet fruit and also for the flowers, which, with a little amber, form a perfume; Eyerdam found the fragrance of the fruits suggestive of ripe pears.

Piura: Caña Dulce water-course, *Haught 178.* Negritos, *Haught 267.* Prov. Piura, *Weberbauer 5940; 5941.*—San Martín: Tarapoto, *Williams 6047* (det. Standley). Jepelacio, *Klug 3439* (glabrate, det. Standley, *P. angulata*). Boquerón Pass, *Allard 21707* (det. Lyman Smith).—Huánuco: Divisoria, *Allard 21235.*—Loreto: Mishuyacu near Iquitos, *Klug 322* (det. Standley). Clearing, Pongo de Manseriche, *Mexia 6299* (det. Morton, *P. hygrophila*).—Cuzco: Echarate, *Goodspeed Exped. 10483* (det. Standley). Idma, *Vargas 8528.* "Muy-

aca" (Mexia); "bolsa mullaca" (Klug; Williams); "capuli" (Ruiz & Pavón).

Physalis viscosa L. Sp. Pl. 183. 1753; 133. *Cacabus parviflorus* Rusby, Mem. Torr. Bot. Club 4: 233. 1895, fide Rydberg.

Well-marked by the dense (typically) stellate pubescence; a perennial with subcordate leaves and rather large (funnelform, 1–2 cm. long) spotted or clear greenish-yellow flowers; calyx in flower 3–10 mm. long, in fruit 2–5 cm. long; peduncles 1–4 cm. long, lobes unequal, ovate; anthers yellow, about 3 mm. long; berries orange or yellow.—A coastal species as subsp. *maritima* (M. H. Curtis) Waterfall, including several variants in degree (to absence), l.c. 134, and quality of pubescence.

Peru: (*Ruiz & Pavón*). South America to the southern United States.

7. CACABUS Bernh.

Thinogeton Benth. Bot. Voy. Sulph. 142. 1844. *Streplostigma* Regel, Gartenfl. 322, *pl. 68*. 1853.

Diffuse, or often prostrate and trailing, pilose or viscid herbs with solitary campanulate or broadly funnelform flowers and shortly toothed calyces, enlarged in fruit. Filaments of three lengths and attached at various levels; stigma lanceolate. Leaves usually long-petioled, subentire to deeply sinuate-dentate.—Distinguished from *Physalis* L. particularly by the habit and the often larger flowers, apparently usually glabrous within at the base (cf. Bitter, Repert. Sp. Nov. 17: 245. 1921); Sleumer describes the corolla of the former as rotate or applanate-campanulate, that of *Cacabus* as tubular-campanulate or broadly infundibuliform. Seems to be an expedient or academic segregate; however, as observed by Waterfall in his careful review of the North American species of *Physalis* L., generic definition awaits properly the considered judgment of an informed student.

Flowers yellow; some leaves subrotund, subcordate, subentire. *C. flavus.*

Flowers white, purple-tinged; leaves various, rarely ever as above in all respects.

Flowers to 1.5 cm. long; fruiting calyx 4 mm. long, the berry partly exserted..... *C. pusillus.*

Flowers 2–5 cm. long; fruiting calyx 1–2 cm. long, including the berry ..... *C. prostratus.*

Cacabus flavus Johnst. Contr. Gray Herb. 85: 177. 1929.

A prostrate sparsely villous glandular annual; leaves cordate, 3–6 cm. long, subentire; petioles 3–9 cm. long; pedicels axillary, 1–2 cm. long; calyx 9–11 mm. long, the lobes 4–5 mm. long, membranous, tightly investing and finally ruptured by the fruit; corolla yellow, 2–4 cm. long.—Apparently the only yellow-flowered species, at least in this character suggesting *Physalis* L. but probably allied to *C. integrifolius* Phil. according to the author; the flowers are very much larger; the data of specimens of Velarde Nuñez and Hrdlicka do not include color of flower, but from locality (at least of former) presumably it was yellow; otherwise both are probably *C. prostratus*, sens. lat.

Arequipa: Tiabaya, *Pennell 13066*, type.—Moquehua: Moquehua, *Weberbauer 7459*. Lomas de Pongo, *Nuñez 1480?* Valley of Río de Las Trancas, *Hrdlicka*.

Cacabus prostratus (Dombey) Bernh. Linnaea 13: 360. 1839. *Physalis prostrata* Dombey ex L'Hér. Stirp. Nov. 43, *pl. 22*. 1784. *P. limensis* Retz. Obs. 5: 22. 1791, fide Nees. *Physaloides prostrata* (Dombey) Moench. Meth. Suppl. 178. 1802. *Thinogeton maritima* Benth. Bot. Voy. Sulph. 142. 1844. *C. maritimus* (Benth.) Benth. Hook. Gen. Pl. 2: 897. 1876. *Dictyocalyx Miersii* Hook. f. Trans. Linn. Soc. 20: 203. 1847, fide Svenson. *T. Lobbianum* Miers, Ann. Mag. Nat. Hist. 2, 4: 360. 1849. *C. nolanoides* Miers, l.c. 255, and Ill. S. Am. Pl. 2: 51. 1849–1857. *C. multiflorus* Damm. Repert. Sp. Nov. 15: 366. 1919, fide Svenson.

A grayish clammy-viscid soon trailing herb, the flexuose striate stems more or less foliose with unevenly sinuate-angulate or dentate-lobulate to subentire long-petioled leaves, often rather ovate and acute to attenuate at base, a few to 10 cm. long and not rarely nearly as wide or the upper lanceolate-oblong; peduncles solitary or geminate, a few mm. to 2 cm. long or longer in fruit, when curved or reflexed and the calyx then accrescent, more or less 5–10 costate-angled; corolla somewhat pilose, 2–5 cm. long, purple or usually white at top where about 2.5 cm. wide; berry about 1 cm. in diameter, closely invested by the firm to thin-papyraceous calyx.—Svenson, Amer. Journ. Bot. 33: 481–482. 1946, concluded, apparently correctly, that probably only a single species of this genus is native to the South

American coast and recorded the following important observations: Bentham and Hooker reduced Miers' six species to *C. prostratus* and *C. maritimus*, the fruiting calyx of the former obscurely 5-angled, that of the latter 10-angled with 5 of the angles a little more prominent, but from Bernhardi's description of *C. prostratus* this difference does not appear to be very much; *C. multiflorus* Damm. as to type has several flowers on foliose-bracted axillary branchlets and may be distinct or at least a local variation. The elongate inflorescences described by Dammer are identical on well-developed Galapagos specimens; Riley, Kew Bull. 227. 1925, found no glands in the pubescence and that seems to be the case in all specimens, quartz grains adhering to the viscid jointed trichomes simulating glands. Calyx increases as capsule expands; this early is clearly 2-celled but at maturity has at base a stiped ligneous 4-celled structure with incurving walls, to which are attached the innermost seeds; the ripe capsule has ten slightly elevated ribs, becomes soft, dark green to black, a little elongate, the pale brown seeds buried in a dark viscid substance. Svenson further describes the plant as starting to flower when very small, the flowers solitary or in pairs in the axils of the succulent leaves but as the prostrate stem elongates (even to 2 meters fide Haught) the inflorescence becomes many-flowered in a paniculate manner, the petunia-like flowers white with a dull purplish center, purple striate in throat and purplish-tinged at apex. Weberbauer found the plant used for fodder. Common on sandy or stony coastal hills. Unfortunately the type collection of *C. nolanoides* (*Mathews 839*, Kew) is without data. Illustrated, Svenson, 404, *pl. 4, fig. 2;* Miers, Ill. S. Amer. Pl. *pl. 49* (*Cacabus nolanoides*).

Tumbez: Zorritos to Cancas, *Weberbauer 7750* (det. Johnston, *C. maritimus*). Puerto Pizarro, *Ferreyra 5970.*—Piura: Pima to Ñomala, *Weberbauer 5931* (type, *C. multiflorus*); *Sandeman 4251; Ferreyra 5884; 6008.* Talara, *Haught 16; Beetle 26200; Johnston 3501; Horton 11595; Stork & Horton 11634.*—La Libertad: Salaverry, *Johnston 3519* (det. Johnston, *C. maritimus*).—Ancash: Lomas de Monzón, *Goodspeed Exped. 9176.*—Lima: Chosica, *Weberbauer 5336; Grant 7397.* San Geronimo, *5899.* Mt. San Augustin, *Weberbauer 5227; 5248.* Near Lima, (*Cuming 972*). Lomas de Lachay, *Ferreyra 3889.* Quive, *Pennell 14292.* Chancay, Chorillos, (*Maclean*). Chancay, Huara, *Ruiz & Pavón; Dombey,* type; *Beetle 9105.* Puente de Verrugas to Surco, *Weberbauer 5216.* Santa Clara, *Weberbauer 1671* (det. Bitter); *Rose 18623.* Santa Eulalia Valley, *Goodspeed & Stork 11480.*—Ica: Prov. Chincha, *Weberbauer 5376;* (*Maclean*).—Huan-

cavelica: Pampano to Huaytara, *Weberbauer 5402*. Galapagos; Ecuador. "Campanillas olorosas," "suruvia," "suravilla."

Cacabus pusillus Bitter, Repert. Sp. Nov. 17: 243. 1921.

Annual herb a few cm. tall, simple or a little branched at base, green but pubescent all over including the corollas with simple many-celled unequal gland-tipped trichomes; petioles to 2.5 cm. long, alate toward blade, this linear to lanceolate or ovate, finally 1–3 (5) cm. long, about a third to as wide, both ends narrowed, obtuse or subacute; pedicels axillary, solitary or binate, 4–5 mm. long, in fruit 5–6 mm. long, arcuate, incrassate; calyx 3.5–4 mm. long, 2 mm. broad, acuminate lobes 2.5–3 mm. long, in fruit subglobose, 4 mm. across; corolla white, lilac, or white and lilac (Weberbauer), tubular-campanulate, 1.5 cm. long, near apex 4–5 cm. across, the short plicate lobes acuminate; free part of filaments 5–6 mm. long, pubescent; style 8.5 mm. long, stigmas capitate; berry very obvious between the calyx lobes, 3 mm. thick, greenish-yellow, granules none, the seeds only about 9, obliquely reniform, reticulate.—Leaves membranous but fleshy in life; unique in the exposed fruit. F.M. Negs. 2528; 2529 (*C. Woitschachii* in herb.).

Arequipa: Tingo, *Pennell 13126*. Arequipa, *Pennell 13045* (det. Johnston); *13178*. Yura, *Weberbauer 6842*, type; *Guenther 12242*. Slopes of Misti, *Sandeman 3823* (det. Johnston). Tía Baya, *Cockerell*.—Tacna: Candarave, *Weberbauer 7388* (det. Johnston). Near Tacna, *Woitschach*.

8. SARACHA R. & P.

Bellinia Roem. & Schult. Syst. 4: 687. 1819. *Kukolis* and *Ulticona* Raf. Sylva Tellur. 55. 1838. *Hebecladus* Miers in Hook. Lond. Journ. Bot. 4: 321. 1845.

References: Dunal in DC. Prodr. 13, pt. 1: 429–433, 682–685; *Hebecladus*, 468–471. 1852; Bitter, Repert. Sp. Nov. 17: 338–346. 1921; 18: 99–112. 1922; 19: 265–270. 1924.

Perennial herbs usually or finally more or less ligneous. Peduncles axillary or lateral, commonly solitary, sometimes reduced or obsolete, the pedicels 1–several, 1-flowered, often subumbellate. Calyx not obviously to more or less accrescent, little or not to widely spreading. Corolla tubular, sometimes shortly tubular- to rotate-campanulate, sometimes broadly and deeply, ordinarily more or less flaring at apex, often dentate between the variously developed lobes. Filaments glabrous or slightly to densely pubescent, anthers suboblong, emar-

ginate to cordate, frequently, as style, exserted, this with clavate or capitate stigma. Seeds compressed-reniform, foveolate-reticulate.—P. Isidro Saracha was a Benedictine botanist who gave rare plants to the botanic garden in Madrid.

As pointed out by Morton in his useful paper "Notes on the Genus Saracha," Proc. Biol. Soc. Wash. 51: 75–77. 1938, *Poecilochroma punctata* (R. & P.) Miers is the type of Ruiz and Pavón's genus and was so accepted, too, by Miers, Ill. S. Amer. Pl. App. 57. 1857. Miers himself, l.c. 148–149, retracted his own action. Nevertheless the "proper" name for Miers' genus is *Saracha* unless the cognomen of Ruiz and Pavón is conserved. Otherwise *Bellinia* Roem. & Schult. may be the correct name for the following plants or at least for those not segregated (as *Hebecladus*). But as Morton noted the matter is not of moment, only a few names being concerned. These are here used as available in order to avoid expression of my opinion, certain to be futile (see Wash. Acad. Sci. 19: 247. 1929).

Bitter, Repert. Sp. Nov. 17–20. 1924, divided the group into four sections, excluding *Hebecladus* Miers but indicating, as Morton, the transition to the latter; Morton, l.c. 76, found that the value of one of the chief distinctions of his sections, namely the presence or absence of minute sclerotic grains among the seeds of the berries, is highly doubtful (as also in *Solanum*); another section rested on glabrous filaments and annular ring; this surely, as Morton remarks, is only doubtfully a good species character; only *Macrosaracha* Bitter, characterized by its much larger campanulate rather than rotate corollas, intermediate to *Poecilochroma* and *Hebecladus*, is well-distinguished (Morton); the corolla, especially in these groups, has 5 glands at base within, conspicuous from their copious red or scarlet exudation, visible as swollen filament bases when dry; however, these occur, in some degree, in otherwise dissimilar species.

The size of flowers recorded from specimens may be misleading, partly of course from contraction but also because the corolla often enlarges considerably after early anthesis; Bitter, too, seems to have had a tendency to over-state measurements. The group needs revision by a student who can study living plants; characters in key are often expedient.

KEY TO SARACHA (including HEBECLADUS)

Flowers usually 2-several, pedicellate in axils or subumbellate on obsolete or more or less apparent peduncles; corolla shorter than 2 cm. if pedicels only 2–3, or long-tubular.

Filaments glabrous or essentially (sometimes granular or with a few trichomes, as *S. sordideviolacea*); plants glabrate.

Corolla tubular, the small lobes erect or suberect.

Corolla about 1–1.5 cm. long, pedicels several. . *H. umbellatus.*

Corolla 2–3 cm. long, pedicels (1) 2 or 3.
H. intermedius, H. bicolor.

Corolla rotate-campanulate or rarely ventricose-campanulate.

Leaves broadly ovate or subrotund, to 4 cm. long or a little longer; peduncles obsolete or short; corolla red, yellowish or white, not lanate; plants shrubby, at least in age.

Corolla tube 8–10 mm. long, lobes to 5 mm. long; shrub.
H. umbellatus.

Corolla tube as lobes obscure; subherbaceous perennials or corolla yellowish (cf. also *S. alata*).

Corolla purplish-reddish; stems slender.
S. lobata, S. sordideviolacea.

Corolla yellowish or white; lower branches stout, ligneous.
S. dentata.

Leaves mostly or all much longer than wide, several cm. long; peduncles soon elongate; corolla yellowish or lanate; perennial herbs (cf. *H. ventricosus, S. biflora*).

Corolla lanate; peduncles often 1-bracteate. . . . . *S. diffusa.*

Corolla glabrate; peduncles not bracted. . . . *S. procumbens.*

Filaments pubescent; plants more or less puberulent or villous (cf. the glabrous *S. alata*).

Corolla tubular, 2.5 cm. long or longer.
H. Weberbaueri Damm. 1906.

Corolla rotate-campanulate.

Indument a puberulence; corolla scarcely 1 cm. long, usually shorter; peduncles shorter than pedicels or none; shrubby, branched (synonyms, *H. Weberbaueri, S. Bitteri*).
S. dentata.

Indument uneven or more defined than puberulence, sometimes sparse, sometimes more or less villous; corolla usually at least 1 cm. long; peduncles often as long or longer than the (1) 2–several pedicels.

Corolla yellowish to white (or bluish at base).

Pedicels (1) 2–3 on forked peduncles; berry often solitary, yellowish or white; stems terete.
H. ventricosus, S. biflora.

Pedicels umbellate, usually several; mature berry dark or black.

Indument eglandular, soon sparse; stems herbaceous.
S. contorta.

Indument usually viscid or glandular villous, early dense; stems angled, frutescent (*S. sinuosa* Bitter not Miers).....*S. villosa.*

Corolla purple or blue; indument in part glandular.
S. propinqua.

Flowers solitary, rarely 2 on a peduncle, campanulate, not rotate, never long-tubular, 2 cm. long, often longer, probably always in full anthesis, scarlet annular glands and secretion conspicuous (species-characters intangible).

Corolla finally 2.5 cm. long, 3–4 cm. wide, little flared apically, lobes apiculate; filaments pubescent at or toward base.

Branches, leaves soon glabrate or glabrous.....*S. Weberbaueri.*

Branches, leaves more or less pubescent.

Filaments glabrous unless adnate part.....*S. Urbaniana.*

Filaments hirsute below.....*H. asperus.*

Corolla about 2 cm. long, 3 cm. wide or smaller, lobes acutely acuminate, flared apically especially if shortly acuminate; filaments glabrous or nearly; plants more or less puberulent.

Flowers usually solitary; trichomes at least mostly simple.
S. ciliata.

Flowers often 2; trichomes at least mostly furcate..*S. Herrerae.*

Saracha alata Dunal in DC. Prodr. 13, pt. 1: 431. 1852.

Sulcate pale green branches 4–5 mm. thick, marked with sessile globose and linear white glands and membranous subalate angles scarcely 2 mm. wide; leaves subsessile, geminate, ovate, cuneate to decurrent base, obtusely subcuspidate, the larger 1–1.5 dm. long, about half as wide, the smaller less than half as large, undulate-subrepand, the 5–6 nerves prominent beneath and minutely white-glandular; peduncles reflexing, 12–18 mm. long; pedicels 10–12, umbellate, filiform, to 1.5 cm. long; calyx subrotate, 1 cm. across, the segments broadly ovate, vix 4 mm. long; corolla rotate-campanulate,

1 cm. long, 12–15 mm. wide, lobes ovate, acute, 6–7 mm. long; stamens in corolla tube, the cylindric filaments 3–4 mm. long, slightly pilose at base, anthers ovate, subacute, 1.5 mm. long; ovary subglobose.—Ex char. perhaps the earliest name for *S. lobata* Bitter or (and) *S. sordideviolacea* Bitter but glabrous except for the sessile glandulosity. F.M. Neg. 29719.

Peru(?): *Ruiz & Pavón*, type in Herb. Boissier (Geneva) as *S. filiforma* Pavón, according to Dunal.

Hebecladus asperus (R. & P.) Miers, Hook. Lond. Journ. Bot. 4: 322. 1845. *Atropa aspera* R. & P. Fl. Peruv. 2: 45. 1799. *Ulticona aspera* (R. & P.) Raf. Sylva Tellur. 55. 1838.

A harshly hirsute dichotomously branched erect purplish herb, the type to 6 dm. high; leaves petioled, geminate, ovate or oblong-lanceolate, entire or repand; flowers yellow-blue, nodding and solitary, subaxillary; corolla campanulate, sub-10-parted, 5 acute lobes alternating with 5 emarginate ones, all spreading, the throat and hirsute filaments violet; berry white, seeds pubescent.—Ex char. this seems to be related to *S. ciliata* Miers, etc., and may be found to be the earliest name for one or more of these seemingly dubious species.

Lima: In the Amancaës Hills near Lima, *Ruiz & Pavón*, type.

Hebecladus bicolor (R. & P.) Miers in Hook. Lond. Journ. Bot. 4: 322. 1845; 470. *Atropa bicolor* R. & P. Fl. Peruv. 2: 45. 1799. *Kukolis bicolor* (R. & P.) Raf. Sylva Tellur. 55. 1838. *Atropa biflora* R. & P. l.c. 44. *pl. 181b*. *Ulticona biflora* (R. & P.) Raf. l.c. *H. biflorus* (R. & P.) Miers, l.c.

A lightly pubescent or sometimes glabrate shrub; flowers 1–4, axillary and lateral, the more or less nutant hirtellous peduncles mostly about 2 cm. long; branchlets somewhat angled; petioles 5–15 mm. long; leaves early geminate, unequal, ovate, now and then angulate or subdentate, acute, the lower 5 cm. long, 2.5–3 cm. wide or larger, soon glabrous, pale and often granulate beneath; calyx weakly 5-angled, the acute lobes little or not spreading, 3–5 mm. long; corolla tubular, striate, pilosulous, slightly constricted below the often reddish or purple-tinged limb, the tube usually yellowish-green, finally at least 2 (–3) cm. long; filaments exserted, thus the bluish ovate-sagittate anthers conspicuous; stigma bilobed; berry white (apparently rarely blue), depressed-globose, subtended by the spreading calyx; seeds lutescent.—The tubular corolla distinctly elongates after early anthesis; in foliage the species simulates *S. bi-*

flora R. & P. but is glabrate; type of *H. bicolor* (R. & P.) Miers not found but ex char. there is only a single species distinguishable here. F.M. Neg. 2530 (*H. biflorus*).

Ancash: Chiquián, *Ferreyra 7427*. Samanco, (*Weberbauer 171*). —Lima: Prov. Huarochiri, Surco and Matucana, (*Ruiz & Pavón*, type, *H. bicolor*); *Hrdlicka; Weberbauer 194* (det. Werdermann). Surco, *Raimondi* (det. Werdermann). Río Blanco, *Killip & Smith 21558; 21751*. Canta, *Pennell 14242*. San Mateo, *Isern 2295; 2545; Ferreyra 5315*. Toward Casapalca, 3,500 meters, *Ferreyra 5407; 6991*. Viso, *571*.—Huánuco: Tingo María, *Ferreyra 1576* (?, flowers white, fruit blue).—Junín: Tarma to Huasahuasi, *Ruiz & Pavón*, (type, *H. biflora*).—Huancavelica: Cordova, *Metcalf 30270*, fruit green (det. Morton). Ecuador? "Suplac" (Ferreyra).

Saracha biflora R. & P. Fl. Peruv. 2: 42, *pl. 179*. 1799; 431. *Bellinia biflora* (R. & P.) Roem. & Schult. Syst. 4: 689. 1819. *Witheringia biflora* (R. & P.) Miers, Ill. S. Amer. Pl. 2: App. 56. 1857.

Stems sparsely pubescent above, herbaceous, angled; leaves ovate, about 10 cm. long, 6–7 cm. wide, undulately margined, rounded at base but subdecurrent into the narrow petiole, the upper geminate; peduncles axillary, solitary, recurving, 1.5–2 cm. long, 2- or rarely 3-flowered; pedicels 5–7 mm. long; calyx campanulate, about 1 cm. long, the ovate acute lobes half as long; corolla yellowish-green, campanulate, spreading, to 1.5 cm. wide, the lobes acute, stamens sometimes twice as long as the corolla; berry white, somewhat flattened. —Inflorescences, including corolla, shortly pilose. Corolla in type little exceeding calyx, perhaps young; sepals acute, 10 mm. long, petals acute, 12–13 mm. long, pubescent. Fruiting calyx lobes rotund-ovate, 7 mm. long and broad, the berry deeply included.

Small yellowish fruits eaten by children (Ruiz and Pavón); filaments glabrous or granulate; corolla white or partly violet (violet, according to Weberbauer, *7602*). Probably should not include the Cuzco and Puno plants with deeply campanulate corollas, reflexed lobes, suggesting those of *H. ventricosus* Baker.

Huánuco: Cani, *3443* (det. Morton).—Junín: Carpapata, *Killip & Smith 24396* (det. Morton). Huasahuasi, *Ruiz & Pavón*, type. —Huancavelica: Mantaro Valley, *Weberbauer 7602* (det. Morton). North of Salcabamba, 3,500 meters, *Stork & Horton 10317?*—Apurímac: Oropeza Valley, *Vargas 9798* (det. Standley, *S. lobata*).—Cuzco: Anta, *Vargas 201*. Marcapata, *Weberbauer 7789*.—Puno: Ackopampa, *Vargas 6978*. Near Limbani, *Vargas 9654*. "Tomatillo cimaron."

Saracha ciliata Miers, Ann. Mag. Nat. Hist. 2, 3: 446. 1849. *S. lacrima-virginis* Bitter, Repert. Sp. Nov. 17: 341. 1921; l.c. 339. *Witheringia ciliata* Miers, Ill. S. Amer. Pl. 2: App. 56. 1857.

Suffruticose below, the upper branches angulate, decurrent-lined, glabrate or sparsely pubescent including the corolla with many-celled single trichomes; leaves ovate-oblong, cuneate decurrent into petiole (this 0.5–4 cm. long), acutely or not obtusely acuminate, to about 8 cm. long, 4–5 cm. wide, mostly smaller, membranous, green, entire or repand; flowers solitary in axils, peduncles 6–11 mm. long; pedicels 5–7 mm. long, deflexed and 1–1.5 cm. long in fruit; calyx basally connate, 6–8 mm. long, diameter about 2–2.5 cm., lobes ovate acuminate, 8 mm. long (10–11 mm. long in fruit), minutely stipitate-glandular within at base; corolla rotate-campanulate, 2–2.5 cm. long, 3–3.5 cm. across (see note below), with 5 acuminate subcucullate pubescent lobes 2–3 mm. long; filaments (4) 6–8 mm. long, glabrous as ovary and style, the latter 7–8 mm. long, stigma capitate; berry white, subglobose, about 12 mm. thick.—After Bitter, who found a single sclerotic granule in the berry examined; he noted the corollas of Weberbauer specimens as 1.5 cm. long, 2.5–2.8 cm. across, greenish; *S. lacrima-virginis* differs ex char. in calyx lobes 6 mm. long, corolla white, 1.7–2 cm. long, 2 cm. across, glabrous within except lobes at tips, filaments pubescent on adnate portion, calyx lobes 6–7 mm. long in fruit, berry with 2 subapical granules; these differences are probably individual rather than genetic. As in the similar *S. Urbaniana* and *S. Weberbaueri* there are 5 blood-red (or violet) glands at base of filaments; from this character originated the fanciful native name; the glands are present in a number of unrelated species.

Lima: San Geronimo, *5912*. Mongomarca, *Weberbauer 5235*. Prov. Huarochiri, *Goodspeed & Metcalf 30248*. Amancaës Hills, *Soukup 3124; Weberbauer 5246a*. Lima Valley, (*Mathews 834*, type). —Huánuco: Tambo de Vaca, *4469?*—Arequipa: Posco, (*Günther & Buchtien*, as *S. lacrima-virginis* acc. to Bruns); *1587* (type, *S. lacrima-virginis*). "Lacrima de la virgin."

Saracha contorta R. & P. Fl. Peruv. 2: 43, *pl. 180a*. 1799; 430. *Atropa contorta* (R. & P.) Spreng. Syst. 1: 699. 1815. *Bellinia contorta* (R. & P.) Roem. & Schult. Syst. 4: 689. 1819. *Witheringia contorta* (R. & P.) Miers, Ill. S. Amer. Pl. 2: App. 56. 1857. *A. umbellata* Roth, Cat. 2: 26. 1800. *Saracha umbellata* (Roth) DC. Cat. Monsp. 142. 1813 (G. Don, Gen. Syst. 4: 451. 1838). *A. Rothii* Poir. Encycl. Suppl. 1: 610. 1810. *Bellinia umbellata* (Roth) Roem. &

Schult. Syst. 4: 688. 1818. *Witheringia umbellata* (Roth) Miers, Ill. S. Amer. Pl. 2: App. 56. 1857.

An annual with entire but often angular-dentate leaves, the larger to 8 cm. long, minutely or scarcely pubescent on both sides, decurrent into a petiole one third as long, and with umbellate pale yellow rotate-campanulate flowers 12 mm. wide; peduncles declined, 6–10-flowered, somewhat contorted as also the pedicels; filaments villous at base; berry black.—Morton, Proc. Biol. Soc. Wash. 51: 76, 77. 1938, suggested that *S. umbellata* is referable to *A. procumbens* (Cav.) R. & P. (and probably *S. contorta* R. & P.), which may be correct if the development of pubescence on filaments is not a continuing (genetic) character; I suspect that at least in the case of these similar plants it is not, since apparently *S. contorta* has not been recognized in the much-collected area of its type, this described as a procumbent fibrous rooted annual; herbaceous stem bright violet below. Leaves useful as a poultice and to relieve pain (Ruiz and Pavón). F.M. Neg. 2549.

Lima: Rough places, Canta to Obrajillo, *Ruiz*, type.

Saracha dentata R. & P. Fl. Peruv. 2: 43, *pl. 179b.* 1799; 432. *Atropa dentata* (R. & P.) Spreng. Syst. 1: 699. 1815. *Bellinia dentata* (R. & P.) Roem. & Schult. Syst. 4: 689. 1819. *Witheringia dentata* (R. & P.) Miers, Ill. S. Amer. Pl. 2: App. 56. 1857. *Hebecladus propinqua* (Miers) Bitter, var. *parviflorus* Bitter, Repert. Sp. Nov. 17: 250. 1921. *H. Weberbaueri* Bitter, l.c. 20: 372. 1924, not Damm. Bot. Jahrb. 37: 638. 1906, nor *S. Weberbaueri* Damm. l.c. *S. Bitteri* Macbr. Field Mus. Herb., apparently ined.

A shortly pubescent or puberulent more or less diffuse perennial finally more or less ligneous, the many stems or branches from a thick base, the lower 5 mm. thick or stouter; lower petioles 1.5 cm. long or longer, the upper only a few mm. long; leaves unequal, the lowest ovate, several cm. long, the upper geminate, the larger of each pair about 1.5 cm. long, half as wide, the upper reduced, ovate-oblong-lanceolate, all entire or undulate denticulate, broadest toward acute base, somewhat attenuate to tip, usually densely puberulent as the 1–4 (or several) -flowered umbels, including the calyces; peduncles 2–6 mm. long, pedicels 3–5 mm. long (in fruit 6–10 mm. long); calyx rotate, 6–8 mm. long, 5–6 mm. across, in fruit twice as wide, the lobes acute to acuminate; corolla white, violet-veined or -tinted, green-dotted below, rotate-campanulate, 6–10 mm. long and broad, the short acute lobes pubescent as (in type) the filaments below, these 4–4.5 mm. long; anthers subcordate; berry copper-colored (always?),

about 7 mm. in diameter.—Specimens from southern Peru may be noted as var. **diversa** Macbr., var. nov., corolla circa 5 mm. longa; filamentis glabris vel minute sparseque puberulis. The development of pubescence on filaments has been used (as in the key) for convenience but it is doubtful that it is always, especially in itself, a true indication of specific values. F.M. Negs. 2550; 2532 (*H. Weberbaueri*).

Leaves (combined with lard) used as a poultice for tumors (Ruiz and Pavón).

La Libertad: Angas-marca, *Weberbauer 7197* (type, *H. Weberbaueri*).—Ancash: Lomas de Mongón, *Goodsp. Exped. 9183.*—Lima: Obrajillo, near Canta, *Ruiz & Pavón*, type. Matucana, *Weberbauer 5275* (distr. as *H. umbellatus*). Viso, *Weberbauer 109* (type, var. *parviflorus*). Near Matucana, *Ferreyra 5422* (det. Cowan, *H. umbellatus*).—Ayacucho: Ocros, *Stork & Horton 10799.* Prov. Lucanas, *Metcalf 30317.* Puquio, *Ferreyra 7181.*—Apurímac: Andahuaylas, *Stork & Horton 10716.*—Cuzco: Huanoquite, *Vargas 2272.*—Arequipa: Lower slopes of Misti, *Sandeman 3808.* Between 3,600 and 3,700 meters, *Weberbauer 6853* (type, var. *diversa*).

Saracha diffusa Miers, Ann. Mag. Nat. Hist. 2, 3: 447. 1849; 683. *Witheringia diffusa* Miers, Ill. S. Amer. Pl. 2: App. 56. 1857.

Nearly glabrous, dichotomously branched, described as herbaceous; petioles slender, 12 mm. long; leaves ovate-elliptic, subobtusely acuminate, narrowed to base, about 7 cm. long, 4 cm. wide, sinuose-serrate and erose-ciliate, obscurely glandular-puberulent both sides on the reticulate veins; umbels 4–12-flowered, peduncle slender, 2–6 cm. long; pedicels filiform, glabrous, 1 cm. long or longer; calyx rotate-angulate, 5-dentate; corolla rotate-angulate, 16 mm. wide, lanate without and long-ciliate; filaments glabrous, about half as long as corolla.—May be, as Morton indicated, Proc. Biol. Soc. Wash. 51: 76. 1938, a part of *S. procumbens* (Cav.) R. & P. F.M. Neg. 33016.

Lima: Hill of Puruchuco, *Mathews 775.*

Saracha Herrerae Morton, Rev. Univ. Cuzco 33 (87): 96. 1944.

Branched from base, the stems to 6 dm. long, the ascending branches often simple, pubescent toward apex with branched trichomes, these found also (with simple trichomes) on the leaves beneath and the denticulate margins, and short (1 cm. long) peduncles, calyx and corolla veins without, the indument (type) otherwise sim-

ple; leaves ovate, to 7 cm. long, 5.5 cm. wide, broadly or sometimes narrowly cuneate to base, decurrent into petioles 2–2.5 cm. long, sparsely strigose above, the trichomes few-celled; inflorescence axillary, 2-flowered, pedicels shorter than peduncles, incrassate apically; calyx green, about 2 cm. across, 5-parted, the long-triangular lobes spreading, 8 mm. long, 5 mm. wide at base; corolla white, rotate-campanulate, 2 cm. long, 3–3.5 cm. broad, the short lobes long-acuminate, glabrous except veins and margin, the intermediate lobes minute, the tube sparsely pilose at base of filaments, these glabrous, straight, shorter than the corolla; glands conspicuous, red; anthers 2.5 mm. long, 1.5 mm. broad; ovary subglobose, glabrous as style, the stigma capitate.—After author, who, in allying it to *S. ciliata* Miers, distinguished it by the branched pubescence. The genetic continuity of character such as pubescence can be proven; cf. Reed Rollins, Rhodora 60: 145–152. 1958.

Junín: Quebrada Occopilla, *Soukup 3637* (det. Morton).—Huancavelica: Yauli, *Stork & Horton 10859* (det. Standley, *S. ciliata*).—Apurímac: Saxaihuamán, *Herrera 3088* (det. Morton); *828*.—Cuzco: Paucartambo, *Balls B6731* (det. Morton). Ollantaitambo, *Cook & Gilbert 417*. Urubamba, *Soukup 73; 740*. "Ahuhaimantu" (Herrera); "Aguaymantu" (Vargas).

Hebecladus intermedius Miers in Hook. Lond. Journ. Bot. 4: 323. 1845; 470.

Stems glabrous; petioles scarcely 2 mm. long (or probably the lower much longer); leaves ovate, angulate-sinuate, to 9 cm. long, half as wide, sparsely pilosulous-puberulent both sides; umbels (type) 3-flowered; peduncles 12 mm. long, pedicels 2 cm. long; calyx 8 mm. long; corolla-tube floccose-hirtellous, 2–2.5 cm. long, the limb 8 mm. long, the sublinear lobes 6–8 mm. long, denticulate in the plicae; filaments slender, glabrous, the sagittate anthers long-exserted.—Compared with *H. asperus* (R. & P.) Miers but indument soft; flowers said to be similar to those of *H. biflorus* (R. & P.) Miers, i.e. *H. bicolor* (R. & P.) Miers.

Lima: Puruchuco, (*Mathews 524*, type).

Saracha lobata Bitter, Repert. Sp. Nov. 18: 103. 1922.

A minutely pubescent (trichomes mostly simple, 3–7-celled), ascending herb; leaves shortly (3–5 mm.) petioled, broadly ovate or rhomboid, about 3–3.5 cm. long and nearly as broad, irregularly and sinuately 5–6-lobed; umbels 4–5-flowered, subsessile or the peduncle

5–6 mm. long; pedicels 6–7 mm. long, to 10 mm. in fruit; calyx stellate-rotate, minutely glandular within, especially near base, 5–6 mm. wide, in fruit twice as wide; corolla pale violet, rotate, 8–10 mm. wide, densely pubescent within at base of glabrous (1–1.2 mm. long) filaments; anthers cordate, only 0.3 mm. long; style 2 mm. long, stigma capitate; berry 6 mm. wide, sclerotic granules lacking.—Probably section *Eusaracha* without sclerotic berry cells. F.M. Neg. 2553.

Lima: Stony places, Huillacachi, southwest of Matucana, *Weberbauer 206*.

Saracha procumbens (Cav.) R. & P. Fl. Peruv. 2: 43, *pl. 180b.* 1799; 431. *Atropa procumbens* Cav. Icones 1: 53, *pl. 72.* 1791. *Bellinia procumbens* (Cav.) Roem. & Schult. Syst. 4: 687. 1819. *Witheringia procumbens* (Cav.) Miers, Ill. S. Amer. Pl. 2: App. 56. 1857.

A procumbent-ascending laxly dichotomously branched lightly pubescent herb, the sulcate stems more or less fistulose; petioles margined by the decurrent leaves, 1–2 (–3) cm. long; leaves solitary below, geminate above, subobtuse or acute, the larger often 5–8 cm. long, 3–5 cm. wide, early somewhat pubescent beneath, finally lustrous and glabrous (typically) both sides, entire or undulate; solitary axillary peduncles 2–4 (–6) -flowered, 8–10 mm. long; pedicels to twice as long and nutant in fruit, pilose or glabrate as the calyces; corolla ochroleucous, green-centered, early ovate, plicate, soon rotate-campanulate, marginally sublanate; filaments glabrous and equal; berry lustrous, black, edible.—Var. *repando-dentata* Dunal, l.c. (*S. repandidentata* (Dunal) Bitter, Repert. Sp. Nov. 19: 269. 1924), has densely ciliate acuminate leaves, sparsely pubescent beneath (trichomes simple), peduncles to 2 cm. long, nearly glabrous as pedicels, corolla 17 mm. wide, acute lobes to 5.5 mm. long, berry 12 mm. in diameter (Bitter). Leaves have cleansing, healing virtues (Ruiz & Pavón). F.M. Neg. 33015 (var.).

Lima: San Buenaventura, *Ruiz & Pavón*, type.—Huánuco: Cuchero, *Poeppig 1419* (type, var.). Río Chinchao, *5060*.—Arequipa: Near Mejia, (*Guenther & Buchtien 105; 106*, fide Bruns).

Saracha propinqua Miers, Ann. Mag. Nat. Hist. 2, 3: 446. 1849; 683. *Hebecladus propinqua* (Miers) Bitter, Repert. Sp. Nov. 17: 246. 1921.

Type a divaricately branched slightly puberulent shrub 1 meter tall, the often many-celled trichomes rarely branched, most abun-

dant on the flowers; petioles 1–nearly 3 cm. long; leaves ovate or broadly lanceolate-ovate, broadly cuneate or subrotund at base, acutely or obtusely acuminate, 3.5–6 cm. long, 2.5–4 cm. wide, subentire or undulate-lobulate, firm-membranous; inflorescence axillary, umbelliform, 3–6-flowered; peduncles 1.5–2 cm. long; pedicels 1 cm. long or 1.5–2.5 cm. in fruit; calyx as corolla limb, the former 8–10 mm. long (in fruit 11 mm.), the latter (typically) about 2.5 cm. across, the spreading acute calyx lobes 3 mm. long, pubescent without with patent trichomes, minutely glandular within especially below; corolla pale blue, medially violet within, 2 cm. long, the glabrous lower part shortly campanulate, little ventricose, the triangular acute lobes 8–10 mm. long, 7 mm. wide, with 5 small teeth between them, obscurely cucullate; filaments 11 mm. long, glabrous only toward tip; style 16 mm. long, stigma capitate, bilobed; berry 5–6 mm. in diameter; sclerotic granules 2.—After Bitter, who notes that the corolla form is at variance to that of other species, resembling rather the corolla of *Saracha*, and he concludes that these groups are closely related. Illustrated, Miers, Ill. S. Amer. Pl. *38*. F.M. Neg. 33136.

Lima: Near Surco, *Ferreyra 5429* (det. Cowan, *H. umbellatus*); *Soukup 3731*. Prov. Huarachiri at Km. 81, *Goodspeed & Metcalf 30242* (det. Morton). Puruchuco, *Mathews 774*. Viso, *Goodspeed Exped. 11530* (det. Johnston). Matucana, *339; Ferreyra 5417* (det. Morton); *Weberbauer 5275*.

Saracha sordideviolacea Bitter, Repert. Sp. Nov. 18: 104. 1922.

A perennial herb with ascending branches, slightly pubescent, the trichomes mostly simple, many-celled; petioles alate, 6–8 mm. long; leaves broadly ovate or rhomboid-ovate, usually 3–4 cm. long, entire or obscurely repand, sparsely short-pubescent; inflorescence sessile, 3–4-flowered, the pubescent pedicels 8–10 mm. long; calyx stellate-rotate, 7 mm. wide, the acute lobes 2 mm. long; corolla sordid violet, rotate, 1.5–2 cm. across, densely pubescent about the filaments, these only 2–2.3 mm. long, glabrous or with a few trichomes; anthers emarginate, 1 mm. long; style to 6 mm. long, stigma obtuse.—Probably belongs to section *Eusaracha* without sclerotic cells (Bitter).

Lima: Rocky cliffs above Matucana, *Weberbauer 5258*, type; *2950*.

Hebecladus umbellatus (R. & P.) Miers in Hook. Lond. Journ. Bot. 4: 322. 1845; 469. *Atropa umbellata* R. & P. Fl. Peruv. 2: 44, *pl. 181, fig. a*. 1799. *Atropa revoluta* Dietr. Nachtrage Gartn.-Lexik.

1: 422. fide Roem. & Schult. Syst. 4: 633. 1819. *H. Turneri* Miers, l.c. 323, fide Bitter.

A rather fragile half-shrub, the minute trichomes 2–4-celled, the ligneous lower branches to 5 mm. thick, the uppermost puberulent as the geminate leaves and umbelliform inflorescence, this somewhat glandular; petioles 1–2.5 (4.5) cm. long; leaves broadly ovate, the largest lower subcordate, 7–10 cm. long, 5–7.5 cm. wide, the upper reduced to about half the size, entire to repand-lobulate, membranous, green, the 5–6 pale nerves and veins prominent beneath; peduncles axillary or lateral, 5–10 mm. long, pedicels several to many, 7–9 mm. long; calyx 4 mm. long, 5–7 mm. across in flower, thrice as broad in fruit, the ovate-lanceolate lobes 3 (–7) mm. long; corolla tubular-campanulate, the dull violet tube 5–8 (–10) mm. long, 5–6 mm. across at apex, the greenish finally recurved lanceolate acute lobes 4–5 mm. long, intermediate teeth lacking; filaments little dilated at base, 12–13 mm. long, glabrous as ovary and style, this finally 15 cm. long, the stigma subglobose-capitate; anthers 1.6 mm. long, in age subsagittate; berry 7–8 mm. in diameter with 2 subapical granules, the many reniform seeds obviously foveolate-reticulate.—After Bitter, Repert. Sp. Nov. 20: 375. 1924; Weberbauer observed a blood-red sap at base of filaments sometimes even filling the tube; the odor of the foliage reminded him of *Hyoscyamus* species (perhaps *H. niger* L. is cultivated in Peru). Apparently *H. Turneri* Miers, named for A. Dawson Turner, an English horticulturist, would be the correct name of the plant if included in *Saracha*, or *H. sinuosus* Miers, l.c. 7: 352. 1848?

Amazonas: Chachapoyas, (*Mathews*, type, *H. sinuosus?*).—Lima: Chancay, Lurín, *Ruiz & Pavón*, type. Lomas de Lachay, Prov. De Chancay, *Ferreyra 3861*. Atocongo, *Nuñez 212; Goodspeed Exped. 9294* (det. Johnston). Amancaës, (*Mathews 722*, fide Miers). Mt. San Augustín, *Weberbauer 5223* (*5228*).

Saracha Urbaniana Bitt. & Damm. Repert. Sp. Nov. 17: 442. 1921.

Suffruticose; pubescence of many-celled trichomes sparse and simple, mostly ciliate on the branchlets and leaves beneath, especially on the veins; petioles 1–3 cm. long; leaves subentire, rather rhomboid, usually 4–7 cm. long; inflorescence 1-flowered, the peduncle 5–8 mm. long, the pedicel to 1 cm. long; calyx nearly 1 cm. connate, lobes 10–13 mm. long, within at base minutely glandular; corolla bluish-white, broadly campanulate, 3–3.8 cm. long, about 4 cm. wide, pubes-

cent, the lobes 5–8 mm. long, within at base glabrous but with 5 violet glands; filaments 12–15 mm. long, pubescent below, style 1.5 cm. long; berry about 14 mm. in diameter with 2 sclerotic cells near apex. —A beautiful species, near *S. ciliata* Miers but with very much larger flowers, and related to *S. Weberbaueri* Damm. but with different and pubescent foliage.

Lima: Above San Bartolomé, *Weberbauer 5262; 5305.*

Hebecladus ventricosus Baker in Saund. Refug. Bot. 3: *pl. 208.* 1870.

Erect shrub, glabrous or essentially except for puberulence on calyx, and cilia on margins of ovate leaves, these 7 cm. long or longer; peduncles and pedicels subequal; flowers usually 2, rarely solitary, nutant; calyx spreading, accrescent after anthesis; corolla pale yellow, somewhat purplish at base, campanulate-ventricose (constricted at throat), 12 mm. long and wide, the lanceolate lobes recurved, minute teeth in the intervals; stamens and style much exserted, the latter finally about 2 cm. long.—Apparently the filaments as corolla are glabrous; the author remarks that corolla shape is different from any species described by Dunal but except in corolla resembles *H. viridiflorus* (HBK.) Miers, 469, of Ecuador; that, however, has a tubular corolla; rather it seems to be a cultivated state of *S. biflora* R. & P. Type by Farris (not seen), no data; flowers 1.5–2 cm. long in cultivated examples referred here.

Peru: Without locality (*Farris*, type).

Saracha villosa (Zucc.) G. Don, Syst. 4: 1838; 430. *Atropa villosa* Zucc. in Roem. Coll. 130. 1809. *S. erecta* (Zucc.) Roem. & Schult. Syst. 4: 684. 1818. *Witheringia villosa* (Zucc.) Miers, Ill. S. Amer. Pl. 2: App. 56. 1857. *S. sinuosa* Bitter, Repert. Sp. Nov. 18: 101. 1922?, vix Miers, in Hook. Lond. Journ. Bot. 7: 352. 1848.

Stems more or less woody; branches and leaves, especially beneath, usually densely viscid-villous; petioles winged, 12–15 mm. long; leaves entire or sinuate, cordate-ovate, acuminate, the larger about 5 cm. long; umbels 5–9-flowered, the villous peduncle 6–8 mm. (–1.5 cm.) long, the puberulent cernuous pedicels papillose, 4–6 mm. long; calyx accrescent; corolla greenish-yellow, rotate, small or large, somewhat pubescent.—As suggested by Dunal, probably this and several other names are a part of *S. contorta* R. & P.; apparently the plant of Miers is allied to or the same as *H. umbellatus.*

Lima: North of Barranca, *Morrison & Beetle 9099; Goodspeed Exped. 9228.*

Hebecladus Weberbaueri Damm. Bot. Jahrb. 37: 638. 1906.

A puberulent shrub with greenish tubular flowers in axillary umbels of 3–5; petioles 6–10 mm. long; leaves ovate-lanceolate, obliquely cuneate at base, 3–6 cm. long, 2–4.5 cm. wide, peduncles 1.5–4 cm. long, pedicels 1–2 cm. long; calyx 17 mm. across, lobes ovate, acute, 5 mm. long, stellulate without; corolla tube pilose within, floccose without, 28 mm. long (as style), the larger teeth 6 mm. long, the smaller 1 mm.; stamens little exserted, filaments pilose, anther sagittate, 3 mm. long, stigma clavate; berry semi-included, 12 mm. in diameter.—Apparently related to *H. intermedius* Miers but ashy pubescent even to the stems. Doubtfully distinct.

Ancash: Grass-shrub formations, Ocros, Prov. of Cajatambo, *Weberbauer 2652.*

Saracha Weberbaueri Damm. Bot. Jahrb. 37: 638. 1906; 344. *S. pallascana* (Bitter) Macbr. Field Mus. Bot. 8: 109. 1930. *S. Weberbaueri* Damm., subsp. *palascana* Bitter, Repert. Sp. Nov. 19: 267. 1924.

Related to *S. Urbaniana* Bitt. & Damm. but nearly glabrous and herbaceous above; leaves broadly ovate, rounded to shortly acute base, more or less long-acuminate or caudate-acuminate; branches supported in shrubs; peduncle 0.5–1.5 cm. long; pedicels 1.5–3 cm. long; connate part of calyx 12 mm. long in fruit; corolla violet with green veins, 3.5–4.5 cm. long, 3.5–5.5 cm. wide, lobes 5–6 mm. long, anthers 4 mm. long; style 17–22 mm. long; berry 15–16 mm. thick.—Type a perennial herb but certainly ligneous at base (Bitter); to 2 meters tall. Dammer noted the basally pilose filaments as unequal; Bitter remarks that this is due to their development at different times, finally becoming equal in length. Perhaps always a half-shrub in age; leaves sometimes only 3–4 cm. long, half as wide, peduncles even obsolete, pedicels a cm. long or less, corollas greenish-white, bluish-green at base within, about 3 cm. long, 3.5 cm. broad. Such characters can scarcely be concomitant or taxonomically significant even varietally; nevertheless, they indicated a subspecies (*pallascana*) to the over-industrious Bitter; surely my usually protective laziness failed me that I ever recorded it as a species.

Ancash: Ocros, Prov. of Cajatambo, *Weberbauer 2657*, type.—Lima: Above Supe, (Weberbauer, 170).

9. DUNALIA HBK.

Dierbachia Spreng. Syst. 1: 512, 676. 1825. *Acnistus* Schott, Wien. Zeitschr. 4: 1180. 1829, fide Kuntze. *Iochroma* Benth. Bot. Reg. 30: *pl. 20.* 1845. *Lycioplesium* Miers in Hook. Lond. Journ. Bot. 4: 330. 1845. *Chaenesthes* Miers, l.c. 336. *Cleochroma* Miers, l.c. 7: 349. 1848. *Codochonia* Dunal in DC. Prodr. 13, pt. 1: 482. 1850.

References: Dunal in DC. Prodr. l.c. 482 et ref. 1852; Sleumer, Lilloa 23: 117–142. 1950.

Shrubs, often spinescent and then sometimes simulating *Lycium* L. but at least as to Peru with larger leaves, longer, narrower fasciculate-umbellate flowers. Calyx not or slightly accrescent, but more or less supporting to rarely sub-enclosing the berry (*Iochroma*), tubular to subcampanulate, somewhat unequally dentate, sometimes bilobed or laterally (especially in age) cleft. Corolla subcampanulate to infundibuliform-tubular or tubular, often slightly curved, the lobes plicate or more or less induplicate-valvate. Filaments dilated or not below, smooth or minutely appendaged, glabrous or more or less pubescent, usually affixed basally or submedially. Calyx if accrescent (*Iochroma*) not inflated. Seeds reniform, somewhat compressed, embryo more or less arcuate. Flowers rarely 6-merous; Bitter noted much variation in size and count (some to 50 or about 80) of stone granules. It is doubtful if there is a natural distinction between *Iochroma* Benth. and *Dunalia* HBK., the characters apparent when the original species were known being, it seems, actually the same, developed in varying degree.

Sleumer, l.c., has given a precise key to related genera (Solaninae) and to the species of Argentina and Bolivia but he avoids placing the variable *D. arborescens* (L.) Sleumer! However, he has discussed that species and helpfully listed all names considered valid as well as many probably referable to *Dunalia;* he has followed Kuntze in including *Acnistus* Schott, contrary to Hitchcock, Ann. Mo. Bot. Gard. 19: 198. 1932, the latter using calyx and form of corolla as basic generic indications; a number of groups could quite as logically and much more conveniently be treated together as sections under fewer common (generic) names, as the differences are often trivial or somewhat variable; *Nicotiana* L., as recently defined, exhibits great diversity in corolla-form, *Cestrum* L. in stamen character.

Omitted from key is the spinescent *Fregirardia Dunaliana* Wedd. with small dark violet corollas, ex char. probably a *Dunalia,* sens. lat.

KEY TO DUNALIA (including IOCHROMA)

Corolla more or less campanulate; lobes and tube subequal; flowers few to many, often at leafless nodes.....*D. arborescens.*

Corolla tubular to funnelform; lobes clearly shorter than tube; flowers 1-many, often with leaves.

Leaves alternate or subopposite, subequal, usually some or all 4 cm. wide or wider; calyx somewhat accrescent, sometimes slightly or partly enclosing berry; spines always lacking.

Corolla 3–6 cm. long, orange-red, blue or violet; filaments pubescent except *I. grandiflorum.*

Corolla orange-red, densely tomentose, about 3 cm. long. *D. peruviana.*

Corolla blue-purple or violet, puberulent or pubescent, 3–6 cm. long.

Filaments puberulent or pubescent below; corolla 3–4 cm. long, limb 1 cm. broad.....*D. tubulosa.*

Filaments glabrous below; corolla to 6 cm. long, throat expanded, to 2.5 cm. broad.....*I. Warscewiczii.*

Corolla about 2 cm. long, greenish-yellow or reddish to purple-red; filaments glabrous (known).

Flowers 6-merous, reddish; filaments nearly free; anthers 3–4 mm. long.....*D. solanoides.*

Flowers 5-merous, usually yellowish; filaments affixed submedially; anthers 2.5–3 mm. long.....*D. umbellata.*

Leaves at least early unequal in fascicles, the largest rarely 4 cm. wide (unless *D. lycioides, D. spinosa,* both spinescent), all often much smaller; calyx scarcely or not accrescent.

Calyx early truncate, typically 5-cusped or -apiculate; leaves mostly or all widest submedially, to 5 cm. long; corolla 10–12 (15) mm. long, pubescent within. *D. brachystemon, D. spathulata.*

Calyx soon lobate or denticulate; leaves usually somewhat obovate or oblong-spatulate, rarely 5–8 cm. long; corolla (full anthesis) at least 1.5 cm. long.

Leaves mostly or all wider than 5 mm. and longer than 1 cm.; spines mostly lateral or lacking.

Indument known within corolla near base (types); filaments obscurely to clearly appendaged (types); branchlets usually spiny.

Leaves 1–2.5 cm. long or if to 4 cm. long, distinctly obovate; corolla 1.5–2.5 cm. long (following may be 2 or 3, even a single variable entity).

Filaments (type) free nearly to base; leaves more or less obovate, usually about 1 cm. wide or wider. *D. obovata.*

Filaments about one-third adnate; leaves lance-spatulate to elliptic-obovate, 5–12 mm. wide (types) or wider.

Appendages short, membranous (or none?); filaments glabrous..... *D. lycioides.*

Appendages 6–7 mm. long; filaments puberulent.

Leaves suboblong, undulate..... *D. angustifolia.*

Leaves elliptic-obovate, plane.... *D. Weberbaueri.*

Leaves mostly or all 3.5–8 cm. long, often spatulate; corolla 2.5–4 cm. long.

Corolla 2.5 cm. long; filament teeth bifid, tomentose; type espinose..... *D. lilacina.*

Corolla 3–4 cm. long; filament teeth glabrous; spines present (always?)..... *D. Besseri, D. spinosa.*

Indument unknown inside corolla; filaments smooth (types, unless *D. lycioides*); branchlets often espinose or axillary, (nodal) spines 1 cm. long.

Corolla to 2 cm. long; leaves sometimes several cm. long. *D. lycioides.*

Corolla to 3 cm. long; leaves 4–10 mm. wide. *D. dolichostyla.*

Corolla half as long; leaves usually 12–15 mm. wide (unless *D. horrida*).

Leaves (larger) 12–15 mm. wide; spines none. *D. Dombeyana.*

Leaves 4–6 mm. wide; spines stout, apical or nodal. *D. horrida.*

Leaves about 5 mm. wide, 10–12 mm. long or smaller; branchlets often many, 2–2.5 cm. long, spine-tipped. . *D. horrida.*

Dunalia angustifolia Damm. Bot. Jahrb. 50, Beibl. 111: 54. 1913.

Branchlet tips, younger leaves beneath and flowers more or less puberulent; nodal spines 1–2 cm. long; petioles a few (to 10) mm.

long; leaves narrowly oblong-elliptic, acute at base, subobtuse, 1.5–2.5 cm. long, 4–8 mm. wide, often strongly undulate-margined; pedicels solitary, 1 cm. long; calyx 4–5 mm. wide and long, broadly ovate lobes 1.5–2 mm. long; corolla violet, 2–2.5 cm. long, about 6 mm. across at top, puberulent also within at base as the unequal filaments, these 19–24 mm. long, appendages 7–10 mm. long; anthers 4 mm. long; style 22–27 mm. long, stigma capitate.—Sleumer, l.c. 122, suggested that this and *D. Besseri* may be the same, a possibility noted in manuscript by me. F.M. Neg. 2515.

Arequipa: Base of Misti, *Weberbauer 4828*, type.

Dunalia arborescens (L.) Sleumer, Lilloa 23: 124. 1950. *Atropa arborescens* L. Amoen. Acad. 4: 307. 1759. *D. campanulata* (Lam.) Macbr. Field Mus. Bot. 8: 109. 1930. *Cestrum campanulatum* Lam. Encycl. 1: 688. 1789. *Lycium aggregatum* R. & P. Fl. Peruv. 2: 45, *pl. 182a.* 1799. *L. guayaquilense* HBK. Nov. Gen. & Sp. 3: 50. 1818? *L. floribundum* HBK. l.c. *L. ovale* Roem. & Schult. Syst. 4: 698. 1819? *Acnistus guayaquilensis* (HBK.) G. Don, Gen. Syst. 4: 461. 1838. *A. floribundus* (HBK.) G. Don, l.c. *A. sideroxyloides* G. Don, l.c.? *Pederlea aggregata* (R. & P.) Raf. Sylva Tellur. 54. 1838. *A. aggregatus* (R. & P.) Miers in Hook. Lond. Journ. Bot. 4: 341. 1845. *A. confertiflorus* Miers, Ann. Mag. Nat. Hist. 2, 4: 31. 1849? *A. arborescens* (L.) Schlecht. Linnaea 7: 67. 1832?

A shrub or tree sometimes 10–15 meters tall, with often ample petioled oblong to elliptic leaves, more or less floccose at least beneath especially when young, and greenish-white or cream-colored fragrant flowers, few to many in fascicles along the light-barked cicatrose branchlets; pedicels about 6–15 mm. long, slender or subfiliform except at apex or stouter when shorter; calyx glabrate to floccose, truncate and sometimes obscurely toothed, becoming irregularly 3–5-lobed in age; corolla campanulate-funnelform, 8–17 mm. long, pubescent within only at base of filaments, glabrous to puberulent without; stamens often barely, sometimes shortly, exserted; fruit globose, finally orange color, 4–5 mm. thick.—This may be treated as a variant of *D. arborescens* (L.) Sleumer, typically of the West Indies (Central America, Brazil, fide Sleumer), with very slender pedicels and soon much exserted stamens; possibly it will be found merging with forms of the widely distributed *D. arborescens*, which, as noted by Sleumer, may include a number of species but most likely not Peruvian, described under *Dunalia*, *Acnistus*, *Lycioplesium* and *Lycium;* the Peruvian collections vary considerably even in

characters of pedicels and flowers but may be classified as *D. arborescens* (L.) Sleumer, var. **campanulata** (Lam.) Macbr., comb. nov. Miers, l.c. 340, described *A. arborescens* (L.) Schlecht. as variable in size of leaves but glabrous as pedicels, these slender, and corolla, this very short, broader in proportion than in any other species, 8–10 mm. long, 4 mm. across, calyx smooth, membranous, stamens far exserted. Var. *campanulatum* (i.e. *L. aggregatum*) is more or less pubescent, stamens scarcely exserted to exserted, leaves tomentulose beneath. Leaves of *A. guayaquilensis* glabrous above, pubescent beneath, as *L. floribundum*. *A. sideroxyloides* G. Don, l.c. from Río Magdalena (Lima or Cajamarca) has no distinctive character. Often found near partly dry stream or on rocky slopes.

Earthenware used on a fire of the wood, which burns noisily, often breaks, whence the name "quiebra ollas" (Ruiz and Pavón); the leaves with lard are used as an emollient (Ruiz and Pavón); for rheumatism (Klug).

Cajamarca: Río Magdalena, *Bonpland* (type, *L. floribundum;* also *A. sideroxyloides?*).—San Martín: Jepelacio, *Klug 3565*. Rioja, *Woytkowski 27*.—Ancash: *Weberbauer 2648*.—Lima: Chosica, *533; Asplund 13768; Rose 18547; Ferreyra 2840; Mexia 04001* (det. Johnston, *A. umbellatus*). Atocongo, *Pennell 14754*. Pachacamac, *Mexia 8098* (det. Morton); *04047* (det. Johnston, *A. umbellatus*). Chancay, *Ruiz & Pavón* (type, *L. aggregatum*); *Wilkes Exped.; Eyerdam 9068; 9121* (det. Johnston, *A. umbellatus; 9121* abnormal from a "rust").—Huánuco: Chulki, *Sawada 59*. Near Huánuco, *2313; Ruiz & Pavón*. Muña, *4004*. Huacachi, *4142*. Pampayacu, *Kanehira 229*.—Loreto: Iquitos, *Killip & Smith 27157* (det. Moldenke). To the Caribbean and Central America. "Quiebra ollas" or "macapaqui."

Dunalia Besseri Damm. Bot. Jahrb. 50, Beibl. 111: 56. 1913.

Young branches more or less tomentose puberulent; leaves sublanceolate, 3.5–5 cm. long, 5–8 mm. broad; calyx-teeth ovate-triangular, about 2 mm. long; corolla puberulent, tubular, about 3 cm. long, 5 mm. across at apex, within at base pilose-puberulent, the teeth 1.5 mm. long; filaments puberulent, the entire (?) appendages about 6 mm. long.—Perhaps only a form of *D. spinosa* (Meyen) Damm.; the scrap type shows no spines; the large leaves, long-cuneate to base and slightly narrowed to obtuse tip, simulate those of *D. spinosa;* Bitter found granules not solidified, so no count. F.M. Neg. 2516.

Peru(?): *von Besser*, type.

Dunalia brachystemon A. Br. & Bouché, Ind. Sem. Hort. Berol. App. 6. 1861.

Near *D. spathulata* (R. & P.) A. Br. & Aschers. but leaves mostly 2.5–5 cm. long, and, especially, filaments broadly bidentate, the free portion scarcely longer than the anthers.—Probably a form; the type from hedges and vicinity.

Huánuco: Chulki, *Sawada 52*. In serpentine, north of Huánuco, *Stork & Horton 9402* (det. Standley).

Dunalia dolichostyla (Bitter) Macbr. Field Mus. Bot. 8: 109. 1930. *Acnistus dolichostylus* Bitter, Repert. Sp. Nov. 21: 85. 1925.

A densely branched sometimes sprawling spiny shrub with obovate fascicled leaves 1–1.5 (3) cm. long, 4–10 mm. broad; pedicels 8–10 mm. long, clustered; calyx campanulate, about 5 mm. long, nearly as broad, the broad teeth scarcely 0.5 mm. long; corolla dull violet, pubescent above, narrowly elongate funnelform (broadly in some species), 2.5–3 cm. long; filaments adnate below, free for 12 mm., unappendaged; style (stigma small) exserted 7–9 mm., stamens also or these included.—The style is not included in specimens with exserted stamens; filaments free nearly to base, glabrous, as corolla within, this narrower in type than in later specimens which seem to be espinose but only younger branches present on specimens seen. Remarkable species intermediate between true *Dunalia* and the section *Acnistus* (Bitter). F.M. Neg. 2485.

La Libertad: Prov. Santiago de Chuco, *Weberbauer 7087; Stork & Horton 9980* (det. Standley); *West 8166* (det. Johnston, *D. obovata*). Valle de Moche, *Nuñez 2989*.

Dunalia Dombeyana (Dunal) Macbr., comb. nov. *Lycioplesium Dombeyanum* Dunal in DC. Prodr. 13: 492. 1852.

A shrub apparently most similar to *D. dolichostyla;* type spineless; leaves (the larger) only 1.5–2 cm. long, 12–14 mm. wide; calyx obconic-poculiform-campanulate, to 4 mm. long and broad, the broad unequal lobes whitish scarious marginally; corolla only 4 mm. broad, 13–15 mm. long (red?), glabrous within as the filaments, these inserted toward the base; style included but longer than the equal stamens, anthers cordate.—Ex char. this is not exactly *D. obovata* to which Dunal allied it, but diagnostic specific values and their variation potential in this genus are as yet inadequately determined.

D. Pflanzii Damm., Bot. Jahrb. 50, Beibl. 111: 57. 1913, from near La Paz, Bolivia, is *D. lycioides* Miers, fide Sleumer but may be related to *D. Dombeyana*, ex char.; corolla glabrous within, filaments 6 mm. above the base, membranous appendages 1 cm. long, leaves 2.5–8.5 cm. long, 0.5–2.5 cm. wide.

Junín: Near Tarma, (*Dombey*), type.

Fregirardia Dunaliana Wedd. Chloris And. 2: 100. 1857.

Shrub to 2 meters tall, branches light reddish-brown, apically pubescent, armed (the type at least) with sharp spines 1.5–2 cm. long; leaves lanceolate, acute or rarely obtuse, decurrent to petiole, 3–6 cm. long, 5–15 mm. wide, pale green and puberulent both sides; umbels 2–4-flowered, subaxillary, pedicels 1.5–2 cm. long; calyx about 4 mm. long (after anthesis strongly accrescent), poculiform, pubescent, subtruncate between the remote linear-subulate teeth; corolla purple, rotate-subfunnelform, very hirsute in throat, scarcely half longer than calyx; anthers bluish; berry orange, globose, apiculate, finally 8 mm. in diameter, clasped at base by the enlarged calyx, the calyx lobes then unequal.—Similar to *F. eriolarynx* Dunal, 503, of Bolivia, as to type spineless, the leaves glabrous beneath, corolla three times longer than calyx; it is probably a small-flowered species of *Dunalia*.

Tacna: Palca, (*Weddell*, type). Bolivia.

Dunalia horrida (HBK.) Macbr. Field Mus. Bot. 8: 109. 1930; 493. *Lycium parvifolium* Roem. & Schult. Syst. 4: 698. 1819. *Lycium horridum* HBK. Nov. Gen. & Sp. 3: 52. 1818. *Lycioplesium horridum* (HBK.) Miers in Hook. Lond. Journ. Bot. 4: 331. 1845.

Stoutly branched, the approximate uppermost nodes spinose or producing short divaricate spine-tipped glabrate branchlets (in type 2–4 cm. long); leaves 4–7-fasciculate, attenuate into the very short petioles, obovate or suboblong, obtuse, 8–12 mm. long, about half as wide, glabrous, lustrous, the veins obscure; flowers violet, peduncles pulverulent, arcuate-pendulous, filiform, 6–8 mm. long; calyx glabrous, semiglobose-campanulate, about 3 mm. long, obsoletely denticulate, nearly truncate, glabrous as the tubular corolla, this violet, slightly curved, to about 1.5 cm. long, equally and acutely 5-dentate, marginally pilosulous, subequaled by the basally inserted capillary glabrous filaments; style slightly longer than stamens, anthers oblong; berry black.—Incompletely known but suggests a desert or upland version of *D. Dombeyana* or *D. dolichostyla;* corolla

glabrous within in Ferreyra's collection, which matches photo. F.M. Neg. 2490.

Used for fences (cercos), according to Ferreyra.

Cajamarca: Near Magdalena, *Bonpland*, type. Cumbre Mayo, *Nuñez 1601*.—Ancash: Chiquián, *Ferreyra 6196*. "Churur" (Ferreyra).

Dunalia lilacina Miers, Ann. Mag. Nat. Hist. 2, 4: 32. 1849; 687.

Unarmed shrub with fascicled glabrous spathulate oblong leaves about 1 cm. wide, 3.5 cm. long, attenuate into petiole 2 cm. long, and lilac narrowly funnelform flowers about 2.5 cm. long, 8 mm. broad at throat, borne in axillary fascicles; peduncles 12 mm. long; calyx campanulate, 5-nerved, the rounded teeth mucronate; corolla scarcely puberulent without, pubescent below within the nearly entire puberulent limb with 5–6 acute teeth; stamens as style included, 3 shorter, filaments glabrous but with white tomentose fleshy teeth. —Said to differ from all other species by the bifid very tomentose filament-appendages. Known only from cultivation at Kew, origin Peru, fide Index Kewensis.

Peru (perhaps).

Dunalia lycioides Miers in Hook. Lond. Journ. Bot. 4: 334. 1845; 485.

Strongly spinescent shrub 2 meters tall or taller, glabrous unless the purple more or less nutant solitary or geminate flowers; branches flexuose, the axillary spines sometimes several cm. long, sometimes absent; petioles 4–6 mm. long, 1–3-fasciculate; leaves fleshy, lanceolate-spathulate, decurrent, rounded apically, about 18 mm. long, 5 mm. wide or larger; pedicels filiform or slender, to about 1 cm. long; calyx early puberulent, 5-costate, the short subovate mucronulate lobes lanate at tip; corolla deep purple (crimson, Miers), 2 cm. long, limb 8–10 mm. across, lobes short, marginally floccose, the alternate lobules membranous; filaments purple, adnate one-third, free 8–10 mm., the short acute lateral appendages membranous; anthers oblong, yellow, scarcely or more or less exserted; berry finally red, nearly 1 cm. in diameter; seeds compressed-reniform, yellowish, granules 24–26 (Bitter).—After Dunal (mostly, as usual by Dunal, from author); perhaps should include similar species, as *D. dolichostyla*, etc.; question of the validity of floral characters. *Stork & Horton 10708*, referred by Standley with query to *D. spathulata*, may not be this species; calyx in flower denticulate, corolla 2 cm. long, leaves 4

cm. long; possibly is *D. Pflanzii* Damm. (see note under *D. Dombeyana*). According to Sleumer, l.c. 141, Bolivian specimens referred here by him have mature leaves 4–5 cm. long, 1.5 cm. wide. The stamens, fide Sleumer, are not so far exserted as illustrated by Miers (*pl. 2, f. 1*).

Lima: (*Mathews*).—Junín: Tarma and Jauja, (*Mathews 850*, type). —Ayacucho: Toward Matarál, 3,500 meters, *West 3653* (det. Johnston).—Apurímac: Andahuaylas, *West 3745* (det. Johnston, *D. obovata*); *Stork & Horton 10708?* Prov. Avancam, *Vargas 2278*.—Cuzco: Hacienda Churú, Prov. Paucartambo, *Herrera 1023a* (vel affine, Morton).—Arequipa: Above Cotahuasi, 3,700 meters, *Weberbauer 6864*. Mt. Chiwata, *Eyerdam & Beetle 22130* (det. Johnston).—Puno(?): Near Puno(?), *Soukup 412*. Bolivia; Colombia. "Tankar," "majra-huayra" (West).

Dunalia obovata (R. & P.) Damm. Bot. Jahrb. 50, Beibl. 111: 56. 1913; 492. *Lycium obovatum* R. & P. Fl. Peruv. 2: 46, *pl. 183c*. 1799. *L. peruvianum* Hort. ex Dippel, Hand. Laubholzk. 1: 30. 1889, fide C. L. Hitchcock. *Lycioplesium obovatum* (R. & P.) Miers in Hook. Lond. Journ. Bot. 4: 330. 1845.

Glabrous more or less spinose shrub sometimes 2 meters tall or taller, the erect terete light-colored stems with diffuse or spreading branches, adult often naked; leaves at first fasciculate, unequal, later few, obovate, alately decurrent on petioles 4–16 mm. long, obtuse, 3–4 cm. long, 12–15 mm. wide, primary nerves 4–5, faint even beneath; peduncles slender, incrassate above, solitary or geminate, 12–15 mm. long; calyx poculiform, 4 mm. long, 5 mm. across, lobes acute or subacute, little mucronulate; corolla purple-violet, tubular, 14–18 mm. long, slightly ampliate to pubescent limb where 8 or 9 mm. in diameter, the short triangular teeth flocculose marginally; stamens included or anthers visible, filaments glabrous except for villous base; style exserted, stigma clavate, subbifid; berry orange, globose, the small seeds lutescent.—Filaments with obscure to 3 mm. long appendages (Dammer). Dammer, l.c. 53–58, as Dunal, proposed or accepted several segregates of *D. obovata* based largely upon variations in floral pubescence and development of filament-appendages; the value of the former character and possibly of the latter is open to question. Perhaps this should include some if not all of the shrubs assigned specific names on corolla characters; corolla deep blue, anthers white to yellow (Killip & Smith). F.M. Neg. 2521.

Junín: Tarma, *Ruiz & Pavón*, type; *Killip & Smith 21976; Velarde Nuñez 637*. Chongos Bajo, *Soukup 3616*. Quebradas de San Mateo, *Isern 2538*. "Espino."

Dunalia peruviana (Dunal) Macbr., comb. nov. *Chaenesthes gesneriodes* (HBK.) Miers, var. *peruviana* Dunal in DC. Prodr. 13, pt. 1: 488. 1852. *Iochroma peruvianum* (Dunal) Macbr. Field Mus. Bot. 8: 107. 1930.

Upper branches and fasciculate pedicels densely villous-tomentose; petioles about 1 cm. long; leaves ovate, in type about 5 cm. long, scarcely half as wide, probably larger in age, apparently glabrate above, somewhat pubescent beneath; pedicels slender, incrassate above, 3.5–4 cm. long; calyx short, often truncate or unequally 5-dentate, one segment bilobed, the other trilobulate; corolla orange-red, closely tomentose, 3 cm. long, may be longer; stamens and style subequal, subexserted, filaments apparently pubescent, stigma capitately bilobulate.—After Dunal (as most descriptions) but ex char. apparently specifically distinct from the Colombian species of HBK. with equal rounded mucronulate calyx lobes, style longer, stigma trilobulate; the related *I. fuchsioides* (HBK.) Miers, 487, of Ecuador has glabrous corolla; *I. cornifolia* (HBK.) Miers, 488, seemingly also *I. loxensis* (HBK.) Miers, 488, have pubescent filaments, stamens included, and may be near *D. umbellata* (R. & P.) Macbr.

Amazonas: Chachapoyas, (*Mathews*, type).

Dunalia solanoides (Dunal) Macbr. Field Mus. Bot. 8: 109. 1930; 482. *Codochonia solanoides* Dunal in DC. Prodr. 13, pt. 1: 482. 1852.

A more or less puberulent tomentose shrub; petioles 7–10 mm. long, stipules geminate in the axils, ovate-oblong, obtuse, 6–8 mm. long, 4–6 mm. wide; leaves ovate or lanceolate, acuminate, more or less attenuate to acute or sometimes rounded at base, 4–7 cm. wide, to 1 dm. long or longer with (11) 12–13 primary nerves, reticulate veins; flowers in terminal or axillary fascicles or racemiform umbels, funnelform-campanulate-salverform calyx 4 mm. long, 5–6 mm. across in anthesis, in fruit 8–10 mm. broad, the broad unequal teeth obscurely mucronate; corollas reddish toward base, slightly pubescent without, glabrous within, the tube 15 mm. long, 6 mm. wide, at yellowish apex 10 mm. across, the 5 (6) ovate lobes 5–7 mm. long, nearly as broad; filaments 8–10 mm. long, glabrous, affixed at base, anthers 3–4 mm. long; berry black (1 cm. thick) about half enclosed

in the calyx; seeds subreniform, subrostrate and emarginate at base, ochraceous-rufescent; granules none, fide Bitter.—Type 6-merous (*Codochonia* Dunal); approaches the subgenus *Iochroma* but character probably not specific and if not, there is doubtfully a true distinction from *D. umbellata* (R. & P.) Macbr. Corolla 1 cm. long, greenish-lead color (West). The type, *Dombey 335*, without locality, probably came from Lima or Huánuco. F.M. Neg. 6870.

La Libertad: Huamachuco, *West 8192*. Prov. Otuzco, *Lopez M.0314*. Trujillo, *Velarde Nuñez 452*.—Lima: Surco, *Soukup 4236*.

Dunalia spathulata (R. & P.) A. Br. & Aschers. Ind. Sem. Hort. Berol. App. 6. 1861; 500. *Lycium spathulatum* R. & P. Fl. Peruv. 2: 46, *pl. 183a*. 1799. *Acnistus spat(h)ulatus* (R. & P.) G. Don, Gen. Syst. 4: 461. 1838. *Huanuca spathulata* (R. & P.) Raf. Sylva Tellur. 54. 1838. *D. acnistoides* Miers in Hook. Lond. Journ. Bot. 7: 338. 1848?

Glabrous, often rather intricately branched always spineless shrub, ordinarily a meter or two tall; branchlets divaricate, subangulate or subarcuate; leaves scattered or fasciculate, usually obovate-spatulate, not infrequently oblong-subelliptic, but long-attenuate below the middle, canaliculately and subalately decurrent on the slender petiole (this finally 1–2 cm. long), subobtuse, unequal, the larger to 7 cm. long, 3 cm. wide, often smaller, especially when fasciculate; nerves rather prominent on opaque lower surface, visible on the slightly lustrous-resinous upper; axillary or subaxillary sessile umbels with 1–20 1-flowered slender apically incrassate unequal peduncles often lax in flower, many about 1 cm. long; calyx subtruncate, obscurely 5-apiculate, cupulate, about 3 mm. long and broad, in fruit unevenly lobulate, 6 mm. broad; corolla purplish-red or purple, at full anthesis 10–15 mm. long, slightly ampliate, the 1.5–2 mm. long acute lobes puberulent, especially marginally; stamens included, filaments about 6 mm. long, inserted 2 mm. above the base, pubescent below and ordinarily with appendages 3–5 mm. long; anthers oval, 3 mm. long, yellowish-violet; stigma subglobose; berry orange-yellow, 8 mm. in diameter, the lutescent scrobiculate seeds compressed-orbicular; granules none, fide Bitter, but berry immature.—The species of Miers may have been based on mixed material; the chief discrepancy ex char. is the tubular calyx; the smaller (8 mm. long) corolla and appendages 1 mm. long may be due to error or an undeveloped example; these characters may have caused Sleumer to compare the Mathews plant (not seen, at least by Dammer) with

D. arborescens, this always with some indument and different leaves; *D. brachystemon* A. Br. & Bouché with shorter stamen parts, the free filaments and anthers subequal, said to be cultivated and escaped in hedges as at Tarma, seems to have characters of doubtful taxonomic validity; Sleumer has suggested that *Mathews 849* may be *D. arborescens*, sens. lat. F.M. Neg. 2523.

San Martín: San Roque, *Soukup 3103*.—Huánuco: Roadsides, *2312; 3236; 3530; Ruiz & Pavón*, type; (*Mathews 849*, type, *D. acnistoides*). Chulqui, *Kanehira 52; Mexia 04103* (det. Johnston). Huacho, *Stork & Horton 9402* (det. Standley, *D. brachystemon*). "Pachapushti" (Mexia).

Dunalia spinosa (Meyen) Damm. Bot. Jahrb. 50, Beibl. 111: 55. 1913; 494. *Atropa spinosa* Meyen, Reise 1: 469. 1834. *Lycium* (*Grabowskia*) *Meyenianum* Nees, Obs. Bot. 390. 1843. *Lycioplesium Meyenianum* (Nees) Miers in Hook. Lond. Journ. Bot. 4: 332. 1845. *Grabowskia* (*Lycium?*) *Meyenianum* Nees ex Walp. Repert. Bot. 3: 113. 1844–1845.

Nodes—those extended as stout spinose branchlets—and young tips early subfloccose-tomentose; petioles 3–6 mm. long, soon glabrate as the attenuate base of the oblong-lanceolate obtuse leaves, these often 3–4 cm. long, about 1 cm. wide; peduncles puberulent, 1 cm. or longer, 2 cm. in fruit; calyx glabrous, campanulate, rounded at base, the broad lobes soon unequal, 5 mm. long and broad; appendages (2) 3-denticulate; corolla violet, 3–4 cm. long, the limb lightly plicate, 12 mm. long, 5 obscurely puberulent teeth 2 mm. long, 4 mm. broad, ciliate, alternating with 5 teeth 0.5 mm. long, scarcely 1 mm. broad; stamens adnate 2 mm. at base of corolla tube, filaments glabrous, 1–1.5 cm. long, appendages glabrous, bifid, to 7 mm. long; anthers oblong-oval, to 4 mm. long, included (Dammer); fruit orange-red, 8–10 mm. in diameter, calyx 3–4-parted, partly enclosing the globose berry (Miers).—The Tacna specimen matches the negative of the type (Berlin) but the appendages seem to be much smaller. F.M. Neg. 2524.

Arequipa: Near Arequipa, *Isern 2014*.—Puno: Pisacoma, *Meyen*, type.—Tacna: Prov. Tarata, 3,000 meters, *Metcalf 30400* (det. Morton, *D. Weberbaueri*).

Dunalia tubulosa (Benth.) Macbr., comb. nov. *Iochroma tubulosum* Benth. Bot. Reg. 31 (8): *pl. 20*. 1845. *Habrothamnus cyaneus* Lindley, Bot. Reg. 30 (7): Bot. Misc. 72. 1844, not *D. cyanea* P.

de Rouvelle ex Dunal, 1852. *I. cyaneum* (Lindley) M. L. Greene ex Lawrence & Tucker, Baileya 3: 66. 1955. *I. lanceolatum* Miers in Hook. Lond. Journ. Bot. 7: 347. 1848. *Chaenesthes lanceolata* Miers, l.c. 4: 239. 1845. *I. Weberbaueri* Damm. Repert. Sp. Nov. 15: 266. 1918.

Type a 4-meter shrub with more or less densely tomentose branches, leaves beneath, pedicels (2.5 cm. long) and calyces; petioles 2–2.5 cm. long; leaves sparsely puberulent above, 9–11 cm. long, 4–6 cm. wide; flowers blue, clustered; calyx cupulate, irregularly dentate, 6 mm. long, the obtuse teeth 1–3 mm. long, 2–2.5 mm. wide; corolla puberulent, glabrous within, tubular, little ampliate, plicate limb 10-dentate, tube 3.5–4 cm. long, 2–3.5 mm. in diameter, limb 1 cm. across, 5 lobes 3 mm. long, 4 mm. wide, the intermediate 1 mm. long; stamens unequal, included (type), adnate 8 mm. above base, densely puberulent below, less so above, 3.2, 3 and 2.8 mm. long; stigma sub-bilobed.—After Dammer; the Peruvian plant according to him differs from *I. tubulosum* Benth., 490, of Ecuador in having more flowers and longer leaves; the latter species has inflated calyx 8 mm. long, the teeth equal (author); also, corolla more deeply lobed, differences seemingly inconsequential; ex char. nearly *D. cornifolia* (HBK.) Macbr. but larger in all parts. His species if distinct will require (in *Dunalia*) a new name (not *D. Weberbaueri* Damm.). Synonymy after Lawrence & Tucker, l.c. Illustrated, Bot. Reg. 31 (8): *pl. 20.* F.M. Neg. 2508.

Piura: In shrubs near Río Quiros, Prov. Ayavaca, *Weberbauer 6409.* Ecuador.

Dunalia umbellata (R. & P.) Macbr. Field Mus. Bot. 8: 109. 1930. *Lycium umbellatum* R. & P. Fl. Peruv. 2: 45, *pl. 182b.* 1799. *Acnistus umbellatus* (R. & P.) Miers, Hook. Lond. Journ. Bot. 4: 342. 1845. *A. multiflorus* Damm. Bot. Jahrb. 37: 336. 1906. *Acnistus oblongifolius* Rusby, Mem. Torr. Bot. Club 4: 232. 1895? *Kokabus umbellatus* (R. & P.) Raf. Sylva Tellur. 54. 1838. *Trozelia* and *Plicula umbellata* (R. & P.) Raf. l.c. and 55.

Becoming a tree similar to *D. solanoides* but often less pubescent, the leaves glabrate above, the calyx prominently 5-toothed, the teeth acuminate and the stamens inserted at or near the middle of the tube; corolla 1.5 to scarcely 2 cm. long.—Sleumer, l.c. 121, suggested this might include *D. solanoides*, which he thought might be referable to *Iochroma.* Once I distinguished this on sulcate petioles and early 5-dentate calyx but the first character is doubtful and the latter is

apparently variable, the extreme in this type. Allied but distinct is *D. ferruginea* Sod. & Damm. Bot. Jahrb. 36: 384. 1905 (*A. ferrugineus* (Sod. & Damm.) Swan, Misc. Chi. Acad. Sci. 88: 7. 1951), leaves stellate-pilose above, reddish tomentose beneath, corolla 1 cm. long, filaments nearly free, anthers 1 mm. long. Miers described Mathews' specimen: petioles about 2 cm. long, leaves nearly 1 dm. long, 4–4.5 cm. wide, pedicels 3.5 cm. long, corolla tube 14 mm. long, lobes 8 mm. long (perhaps Dunal's species); *Weberbauer 2731* has petioles 6–10 mm. long, leaves 6–17 cm. long, 2.5–7 cm. wide, pedicels 2 cm. long, calyx 4 mm. long and broad, the uneven teeth scarcely 1 mm. long, corolla lobes 5 mm. long; filaments adnate 7 mm., free 2.5 mm., tube 15 mm. long, berry semi-included in accrescent calyx. My collection from a tree 7 meters tall, fruits lead color; Stork & Horton's from a 15-meter tree, yellow-green corollas with fruit early white-veined. F.M. Negs. 2499; 2493 (*A. multiflorus*).

Cajamarca: Llama, *Soukup 4222*. Chota, *Stork & Horton 10048*. —Amazonas: Prov. of Chachapoyas, (*Mathews 3244*, det. Miers).—Ancash: Below Ocros, Prov. Cajatambo, *Weberbauer 2731* (type, *A. multiflorus*). Near Chiquián, *Ferreyra 7386*. Macara, *Nuñez 3239; 3242* (det. Cowan, *A. oblongifolius*).—Lima: Obrajillo, *Ruiz & Pavón*, type. Near Matucana, *Weberbauer 78*.—Huánuco: Cani near Mito, *3452?* (fruit only). Bolivia?

Iochroma Warscewiczii Regel, Gartenfl. 4: 245, *pl. 130*. 1855.

Shrub, to 5 meters tall or taller, the terete upper branches, petioles, peduncles (each to about 4 cm. long) and umbellate-fasciculate pendent pedicels—these at least 5 cm. long, usually longer—more or less glandular pilose; leaves broadly ovate, attenuate into the petiole, shortly acuminate, to 14 cm. long, about 1 dm. wide, paler and tomentulose beneath, the nerves and veins prominent; calyx finally subglobose-inflated, 5-costate, 12–18 mm. long and broad, the 5 shortly ovate acute teeth somewhat unequal; corolla lightly curved, slightly hirtellous, dark violet-blue, the tube about 5 cm. long, 3 mm. thick, the infundibuliform-campanulate limb 2.5 cm. across or more, with 5 equal broad apiculate lobes; stamens included, filaments glabrous except for a few minute trichomes on the upper free portion; stigma bilobulate.—The similar Ecuadorian species *I. grandiflorum* Benth. has glabrous shorter flowers, clustered apically on angled branchlets, *I. macrocalyx* Benth. has hirtellous but subsessile flowers, longer calyx, and *I. tubulosum* Benth. has shorter corollas, limb only 1 cm. across, the white-pubescent margin nearly dentate. Revision

of the group, obviously—and naturally, after a hundred years—is much in order. Type of Warscewicz not seen but the following seems to be his plant; he collected from the Marañón Valley to Bolivia.

Cajamarca: La Tajona, Prov. Hualgayoc, *Weberbauer 1002* (det. Standley, *I. grandiflorum*). Near San Miguel, *Weberbauer 3910;* 258. Río Marañón, (*Warscewicz*, type).

Dunalia Weberbaueri Damm. Bot. Jahrb. 50, Beibl. 111: 53. 1913.

Very near *D. obovata* (R. & P.) Damm. and *D. lycioides* Miers but the filaments hairy at base and their appendages much longer (6 mm. long); spines (type) 2–4 cm. long; petioles 2–7 mm. long; leaves 2–4 cm. long, 7–12 mm. wide, obtuse or acute, cuneate at base; pedicels solitary, 8–18 mm. long; calyx 4 × 4 mm., acute teeth 1 mm. long; corolla violet, 2 cm. long, slightly ampliate toward the plicate limb, the marginally pilosulous teeth acute; filaments 17 mm. long, adnate one-third, puberulent near base, the appendages one-third free, the anthers 2.5 mm. long; style 22 mm. long, stigma capitate. —Perhaps a variant of the shrub of Ruiz and Pavón but appendages long; granules not solidified, no count (Bitter). F.M. Neg. 2526.

Lima: Tambo de Viso, *Weberbauer 117*, type.

10. POECILOCHROMA Miers

Saracha Ruiz & Pavón; compare note under that genus.

Shrubs rarely spinescent with coriaceous or sometimes membranous (probably shade-forms) leaves and rather large solitary or fasciculate broadly but deeply campanulate yellowish (rarely white) more or less purple-spotted flowers; calyx campanulate, very shortly lobed, sometimes unequally 3-lobed, little if at all accrescent.— Genus of convenience, the corolla in shape exactly conforming to the type of *Saracha dentata* Ruiz & Pavón. An interesting genus to revise, possibly with many species but probably with fewer than proposed by Miers, as the apparent differences seem to have little or no concomitance and therefore they may not indicate genetic values. The following key is expedient; using the same characters the species can be sorted also into other units or varieties on the basis of pubescence (quality, position, presence of trichomes on filaments and corolla within), size and shape of corollas, length of stamens. It is probable that heterostyly exists; the stamens may develop at

different times as in *Saracha*. The genus was referred to *Capsicum* by Kuntze; Dunal wrote *P. punctatum* (R. & P.) Miers. One or more species attributed to Peru by Miers were collected in Ecuador.

The bizarre beauty of the flowers, sometimes recalling by their color some Fritillarias, is noteworthy (Weddell).

KEY TO POECILOCHROMA

Corolla glabrous to puberulent or sparsely so within; leaves at most about twice longer than wide, usually oval or elliptic-oblong.

Plants espinose.....*P. Lobbiana.*

Plants spinose.....*P. spinosa.*

Corolla (except *P. guttata*) densely to loosely lanate-floccose within; leaves mostly or all about 3 times longer than wide.

Corolla subglabrous within; branchlets and leaves glabrous; ovary tomentose.....*P. guttata.*

Corolla closely lanate to lightly floccose within; branchlets and leaves glabrous (or nearly) as ovary..*P. frondosa, P. punctata.*

Poecilochroma frondosa Miers in Hook. Lond. Journ. Bot. 7: 355. 1848; 495. *Saracha frondosa* Miers, Ill. S. Amer. Pl. 2: App. 57. 1857.

Branchlets subcompressed, angulate-alate, striate, densely foliose; petioles to 2 cm. long; leaves elliptic, attenuate both ends, to 1 dm. long, about a third as wide, submembranous, glabrous above, sparsely fulvous tomentose beneath, nerves beneath rubescent, margin revolute; peduncles fasciculate, glabrous, apically incrassate, nutant, nearly 2 cm. long; calyx short, red-colored, membranous-margined, unequally and rounded-lobulate; corolla campanulate, fulvous puberulent, 5 cm. long, 2 cm. across, limb sinuately 5-angulate, ciliate, pubescent within below as tube; filaments lightly pubescent with spreading long-articulate trichomes, unequal, half as long as corolla, slightly dilated at base; ovary and style glabrous.—Intermediate to *P. punctata* and *P. guttata* (author) and points up the probable unreliability of the characters emphasized, these doubtfully established genetically.

Amazonas: Chachapoyas, (*Mathews*, type).

Poecilochroma guttata Miers in Hook. Lond. Journ. Bot. 7: 356. 1848; 495. *Saracha guttata* Miers, Ill. S. Amer. Pl. 2: App. 57. 1857.

Similar to *P. frondosa;* petioles to 3 mm. long; leaves solitary, rarely geminate, obovate, acute or shortly acuminate, 7–10 cm. long, about 2 cm. wide, quite glabrous, fleshy coriaceous, veins not apparent, glossy green above, pale beneath, revolute-margined; peduncles to 2.5 cm. long; calyx lobes rounded, unequal, glabrous except tomentose mucro; corolla 2.5 cm. long, throat 2 cm. across, pulverulent (type), glabrous within as style and stamens, the latter equaling three-quarters of the corolla; ovary described as tomentose.—Corolla white (Kanehira), glabrous as filaments and ovary. F.M. Neg. 8564.

Amazonas: Chachapoyas, (*Mathews 1151*, type).—Huánuco: Pampayacu, *Kanehira 187?*

Poecilochroma Lobbiana Miers in Hook. Lond. Journ. Bot. 7: 367. 1848; 496. *Saracha Lobbiana* Miers, Ill. S. Amer. Pl. 2: App. 57. 1857.

Younger branches floccose (indument copper-colored), the older blackish, the branchlets divaricate; petioles 6 mm. long; leaves elliptic, acute both ends or obtuse, to about 4 cm. long, half as wide, revolute, lustrous above, pallid beneath, quite glabrous, the primary pinnate nerves impressed above, reddish and prominent beneath; peduncles 1–3, incrassate apically, somewhat shorter than leaves; calyx sometimes 5-angled, 4 mm. long, 3 mm. across, the short rounded teeth medially mucronulate; corolla finally campanulate, 2.5–3 cm. long, drying orange, pubescent only without or lightly puberulent toward base, limb sinuately 5-angled, 3 cm. across; stamens and slightly longer style glabrous, included, the stigma clavately bilobed.—After Dunal as all descriptions here, who (or the compositor) wrote "*P. Llobbiana* Miers," the author, *P. Lobbiana;* in literature regarding the collector (as in Muhlenbergia 7: 100) he is referred to as Lobb. *P. Lindeniana* Miers, Ecuadorian, has 3 unequal calyx lobes; *P. maculata* Miers, l.c., type by Lobb, without data, differs in leaves to about 4 cm. long, half as wide, fulvous tomentose beneath, corolla yellow, spotted, puberulent in and out (F.M. Neg. 33139). Determinations by Morton. Type (not seen) *Lobb 389*, "Andes of Peru."

Ayacucho: Near Huanta, *Killip & Smith 22186.*—Cuzco: Panticalla Pass, *Cook & Gilbert 1236; 1859.*

Poecilochroma punctata (R. & P.) Miers, in Hook. Lond. Journ. Bot. 7: 354. 1848; 495. *Saracha punctata* R. & P. Fl. Peruv. 2: 42, *pl. 187a.* 1799. *Bellinia punctata* (R. & P.) Roem. & Schult.

Syst. 4: 688. 1819. *Atropa punctata* (R. & P.) Spreng. Syst. 1: 698. 1825. *P. venosa* Rusby, Bull. N. Y. Bot. Gard. 4: 424. 1906?

Branchlets early scurfy puberulent as leaves usually slightly beneath (Ruiz and Pavón), glabrous in age; petioles several to 8 mm. long; leaves rarely geminate, ovate-oblong, 3–4 cm. long or longer, about a third as wide, often larger, veins many, primary nerves 7 or 8 pairs, rather prominent beneath, peduncles fasciculate, few to several, more or less nutant, incrassate apically, 2 cm. long or longer; calyx glabrous, the 5 rounded lobes only 1–3 mm. long; corolla 2 cm. long or longer, and at least as wide, broadly campanulate, the limb sinuate with more or less developed somewhat reflexed lobes, glabrous or puberulent (rarely lanate), purplish yellow and purple blotched or spotted within; anthers oblong; filaments and ovary glabrous.—F.M. Negs. 2513 (named for Weberbauer, ined.); 23089.

Sometimes becomes a small tree, 7 meters tall, the extremely bitter leaves used to alleviate pain (Ruiz and Pavón).

Cajamarca: Socota to Tambillo, *Stork & Horton 10179* (det. Standley).—Lima: Obrajillo, (*Ruiz & Pavón*).—Huánuco: Northeast of Huánuco, *2201*. Tambo de Vaca, *4412*. Muña, Panao, Tambo Nuevo, Portachuelo, *Ruiz & Pavón*, type. Carpish, *Swingle 128; 3128; Ferreyra 1726; 8159* (det. Cowan); *Stork & Horton 9934*.—Huancavelica: Huari, *Nuñez 2117; 10335* (det. Standley).—Cuzco: Santa Ana, *Weberbauer 4939* (as ined. sp.). Paso de Tres Cruces, *Pennell 13860; Weberbauer 6974* (filaments glabrous, corolla lanate). Paucartambo, *Vargas 2108; Balls 6774; Soukup 384; 394; 395*. Lucumayo Valley, *Cook & Gilbert 1285*. Cedrobamba, 3,900 meters, *Edmund Heller 2191*.—Puno: Limbani, *Metcalf 30466* (det. Morton). Puno, *Lechler 2080* (*P. venosa*, fide Rusby). Bolivia?

Poecilochroma spinosa Damm. Bot. Jahrb. 37: 637. 1906.

Branchlets verruculose, spiny; petioles 1–2 mm. long; leaves in type obovate, 1–1.5 cm. long, 6–8 mm. wide, coriaceous, glabrous; pedicels solitary or geminate, 10–12 mm. long; calyx 5 mm. long, unevenly dentate; corolla yellowish, violet-nerved, puberulent without, pulverulent within at base, 2–2.5 cm. long, teeth scarcely 2 mm. long; anthers oval; filaments 19 mm. long, glabrous as ovary and style, this 23 mm. long, stigma 1.5 mm. long.—*Weberbauer 6730*, locality unknown, has membranous sparsely hispidulous leaves, 3–4 cm. long; type described as erect or scandent, 2 meters tall, in river shrubs. Seems nearly *P. Lindeniana* Miers, 496, of Ecuador or even

more similar to *P. Lobbiana* Miers and may be a spinescent state. F.M. Neg. 2512.

La Libertad: Prov. de Bolivar, *Ferreyra 1254*. Toward Angasmarca, *West 8162*.—Ancash: Prov. Huari, 3,600 meters, *Weberbauer 2907*, type; *7014*.—Ayacucho: Above Quinua, Prov. Huamanga, *Weberbauer 5542*.

11. SALPICHROA Miers

Busbeckia Mart. Cat. Hort. Monac. 69. 1829.

Shrubs or small lianas with ovate or ovate-cordate or rarely lanceolate, opposite, geminate, seldom ternate leaves, and (in Peru at least) usually elongate-tubular or narrowly funnelform solitary (or loosely corymbed?) greenish- or brownish-yellow or yellow flowers. Calyx deeply 5-parted, the lobes narrow, little or not accrescent. Stamens (typically) inserted about the middle of the corolla-tube, filaments straight, glabrous, anthers narrow; style filiform, erect, stigma subcapitate; ovary free of fleshy disk, 2-celled as berry; berries free, typically scarlet or red, in some species greenish-white; seeds of original species compressed, rugulose, hispidulous.—When a revision is made the shape of corolla lobes, length of filaments and other characters may be found significant; it is not clear that degree of pubescence and vegetative differences that have been used as specific indicators are reliable criteria; indeed, it is my impression that only about half the names I have had to try to contrast in the key will be found to represent genetic entities. See *Juanulloa microphylla* Dunal, with habit and foliage aspect of this group, also *S. breviflora*, *S. cuspidata*, doubtfully this genus. Miers, in Hook. Lond. Journ. Bot. 7: 353. 1848, altered the name to *Salpichroma*.

The fruits of a Paraguayan species are white and sold in the markets as "cocks' eggs."

KEY TO SALPICHROA

Calyx 2.5–3 cm. long; corolla 7–13 cm. long.

Corolla longer than 1 dm.; calyx 5-parted, segments linear. *S. Didieranum*.

Corolla 7–8 cm. long; calyx segments and tube subequal. *S. dependens*.

Calyx about 0.5–2 cm. long; corolla 1–5 cm. long.

Calyx lobes subulate-linear, about 1 cm. long or longer; corolla finally 2.2–5 cm. long.

Indument eglandular.

Calyx more or less hirsutulous as usually foliage (somewhat); anthers visible; corolla funnelform.....*S. hirsuta.*

Calyx as leaves puberulent; anthers not visible; corolla tubular.....*S. Weberbaueri, S. ramosissima.*

Indument glandular at least in part; anthers often visible; corolla subtubular.....*S. glandulosa.*

Calyx lobes 7 mm. long or shorter; corolla at most 2 cm. long.

Corolla 12–15 (20) mm. long; calyx parted nearly to base.

Corolla dilated or evenly ampliate; pubescence obvious.

Indument (ex char.) not glandular.

Calyx lobes more or less hirsutulous, 5–6 mm. long; lobes oblong-oval.

Plants fragile, lightly pubescent.....*S. dilatata.*

Shrub, more or less grayish pubescent.....*S. diffusa.*

Calyx, as lanceolate corolla lobes, puberulent, both at most 4 mm. long.....*S. Gayi.*

Indument granular-glandular.....*S. tristis.*

Corolla constricted at throat; pubescence essentially lacking. *S. uncu.*

Corolla 8–9 mm. long, glabrous as obvious calyx tube. *S. micrantha.*

Salpichroa dependens (Hook.) Miers in Hook. Lond. Journ. Bot. 4: 325. 1845; 472. *Atropa dependens* Hook. l.c. *pl. 107.* 1837. *Juanulloa microphylla* Dunal in DC. Prodr. 13, pt. 1: 531. 1852.

Shrubby stems pendent; leaves geminate, cordate-ovate, shortly petioled, nearly glabrous but more or less viscid, pale beneath; calyx tubular, finely pubescent, obscurely viscid, 5-parted, finally somewhat enlarged and splitting in fruit; corolla long-tubular, stamens and style well-exserted.—This is the original description, not modified by Miers; corolla truly funnelform and more than 2.2 cm. long, according to Jaubert; plate shows leaves rounded or weakly cordate, petioles 7–9 mm. long, blades 2.5 × 1.5 cm., pedicels 8–12 mm. long, corolla tube to lobes (throat little ampliate) 6 cm. long, 1 cm. wide above, lobes ovate-lanceolate, erect or suberect, 12 mm. long, anthers exserted, exceeded by style, this 8 cm. long; calyx 2.5 cm. long to 3.2 cm. long in fruit which is as long, 1.5 cm. thick, cleft 1 side in flower, widely so in fruit.—A slender very branching

plant, generally growing from the root of some tall shrub among whose branches it rambles for support, extending from 3 to 5 meters, its ultimate pendent extremities covered with large sulphur-colored flowers (collector). It was collected on the eastern side of the Cordillera, above potato cultivation. Type, *Mathews 829*, without data.

Lima: Pariahuanca, 3,400 meters, *Weberbauer 6596* (distr. as *S. glandulosa*).—Huánuco: Tambo de Vaca, *4419*.—Huancavelica: Salcabamba, *Stork & Horton 10332* (det. Standley, *S. glandulosa*).—Ayacucho: Near Huanta, 3,200 meters, *Weberbauer 7515*.

Salpichroa Didieranum Jaubert, Bull. Soc. Bot. Fr. 8: 117. 1861.

A low (2 meters) liana (stem 2 cm. thick near base) with alternate (uppermost subopposite) lanceolate subscabrous leaves and yellow long-funnelform nutant flowers, 12–13 cm. long; leaves subrounded at base, acute, nervose; pedicels short, pubescent; calyx segments linear, ciliate, 2.5 cm. long; corolla lobes acute, marginally floccose; anthers hastate; style enlarged to the claviform stigma; capsule conical, subequaling calyx; seeds reniform.—Related to *S. dependens* (Hook.) Miers and *S. glandulosa* (Hook.) Miers.

Commemorates MM. Ernest and Alfred Grandidier, who, during 1857 and later, toured the American continents, studying natural science.

Cuzco: Ravine near Mollepata pass, road from Lima to Cuzco, Prov. of Anta, 4,400 meters, (*Grandidier frères*).

Salpichroa diffusa Miers in Hook. Lond. Journ. Bot. 7: 335. 1848; 473. *S. foetida* Damm. Bot. Jahrb. 37: 639. 1906, as to Peru, probably.

Flexuose and often divaricately much-branched shrub, the branches alate; leaves geminate, ovate, obtuse at base, subacute, both sides hirsutulous, floccose-margined, about 18 mm. long, 10–14 mm. wide; petioles 8 mm. long; calyx as peduncle 6 mm. long, lobes sublinear, hirsute; corolla yellowish-pubescent, funnelform, tube 12 mm. long, limb 4 mm. long, the oblong lobes reflexed, ciliate; stamens and style included.—According to Raimondi the very aromatic fruits are used in helados. *S. foetida* Damm. of southern Bolivia has corolla only 1 cm. long; *S. Mandoniana* Wedd. Chloris And. 2: 98. 1857, from Socota, Bolivia, ex char. has softly pubescent branches, finely pubescent leaves, exceeded by peduncle, this longer than the

2 cm. long flower (corolla 16–18 mm. long, glabrous), calyx less than half as long. Some or all of the Peruvian specimens of *S. diffusa* Miers (type from Bogota by Goudot but the Maclean specimen (from Peru?) cited by author as the same), may rather be referable to *S. Mandoniana*. Illustrated, Miers, Ill. S. Am. Pl. *pl. 28c.*

Lima: Near Matucana, *Weberbauer 186;* 169.—Ayacucho: Huanta, *Raimondi.*—Arequipa: Above Chuquibamba, *Weberbauer 6848.* Cachendo, (*Guenther & Buchtien 89*, det. Bruns, *S. foetida*). Mollendo, *Weberbauer 1511;* 147. Nevada de Chachani, *Pennell 13266* (det. Johnston).—Puno: Azangaro, *Weberbauer 467;* 185. Without locality, (*Maclean*). Ecuador; Colombia. "Pepinillo."

Salpichroa dilatata Damm. Bot. Jahrb. 37: 639. 1906.

A diffuse subglabrate fragile shrub with angulate branchlets; petioles 7–9 mm. long; leaves truncate at base, sparsely pilose both sides, mostly 1.5–2 cm. long, 10–13 mm. wide; pedicels 2–4 mm. long; linear calyx-lobes slightly hirsute-pilose (to glabrous), 5 mm. long; greenish corolla elongate-urceolate, the tube 1.5 cm. long, 4 mm. wide, the oval lobes 3 mm. long; filaments dilated, 2 mm. long, 1 mm. wide, anthers 3 mm. long; style 1 cm. long, stigma capitate; berry (immature) ovoid, acute, 12 mm. long, 5 mm. thick.—F.M. Neg. 2940.

La Libertad: Prov. Otusco, *López 1025.*—Ancash: Near Ocros, *Weberbauer 2679*, type.—Ayacucho: Near Ayacucho, *Stork & Horton 10804* (det. Standley); *Soukup 4022.* "Cuytulumo" (López).

Salpichroa Gayi Benoist, Bull. Soc. Bot. France 85: 54. 1938.

Scandent, the younger branches pubescent, the older with one side alate; petioles puberulent, 7–9 mm. long; leaves geminate, nearly equal, oblong or oblong-triangular, obtuse or subcordate at base, 14–16 mm. long, 10–12 mm. wide, sparsely and shortly pilose above, pubescent below, 4–5 secondary nerves each side, the 2 lower originating from base; flowering pedicels 3–4 mm. long; sepals free nearly to base, linear, acute, 4 mm. long; corolla minutely puberulent, 12 mm. long, lobes long-lanceolate, 4 mm. long, tube little inflated in upper half; stamens inserted in upper fourth of tube, filaments one-quarter as long as anthers, these 2 mm. long, attaining throat; ovary and style glabrous.—Type, *Gay 2308* (not seen), without data in Herb. Paris.

Cuzco: Prov. Acomayo, near Mayu Huillca, 2,900 meters, *Vargas 255?*

Salpichroa glandulosa (Hook.) Miers in Hook. Lond. Journ. Bot. 4: 325. 1845; 472. *Atropa glandulosa* Hook. Bot. Misc. 2: 230. 1831.

A low spreading much-branched glandular-pubescent shrub at most 1 meter tall with geminate strongly cordate to subcordate (type) leaves and greenish-yellow tubular flowers 3.5–5 cm. long (not including lobes); leaves in dry seasons about 6 mm. long and wide but mostly 1–2 (3.5) cm. long, 8–10 (20) mm. wide; petioles narrow, 6–8 (15) mm. long; pedicels filiform, 6–8 mm. long (type), apically nutant; calyx lobes sublinear, glandular-hirsute, 8–12 (15) mm. long; corolla throat 1 (1.5) cm. across, lobes ovate, reflexing, 8 mm. long; stamens finally slightly exserted, exceeded by slender style; berry greenish-white, glaucous, nearly 3 cm. long and 1.5 cm. thick.—The larger figures are derived from the plate illustrating Mathews' specimens. The var. *longiflora* Dunal (type, Pavón, without data, not Mexico as given) has petioles 8–10 mm. long, leaves 2.5–3 cm. long, 8–9 mm. wide, peduncle as calyx 12 mm. long, corolla 4.5 cm. long, limb 1.5 cm. across, the ovate lobes floccose-margined. Perhaps a more or less glandular state that should be drawn to include the similar forms that are obscurely or not at all glandular. Illustrated, Hooker, Icon. *pl. 106.*

La Libertad: Huamachuco, *West 8127* (det. Johnston, *S. Weberbaueri*).—Lima: Baños, *Wilkes Exped.* Near Casapalca, *Ferreyra 6540* (det. Cowan). Río Blanco, sprawling under great rocks, *3050.* Obrajillo, valley of Canta, (*Cruckshanks*, type).—Junín: Comas, *Weberbauer 6603.* Near Huancayo, *Stork 10932; Killip & Smith 22073; Soukup 3688.* Vicinity of Cerro de Pasco, (*Mathews*).—Cuzco: Paucartambo, *Herrera.*

Salpichroa hirsuta (Meyen) Miers in Hook. Lond. Journ. Bot. 4: 325. 1845 and 7: 334. 1848; 472. *Atropa hirsuta* Meyen, Reise 1: 466. 1834.

A subhirsute diffuse but probably much-branched shrub with geminate (or fasciculate on shoots) ovate leaves obtuse at base, unequally acute at tip, to 5 cm. long, nearly 2 cm. wide, petioles subfiliform, to 3 cm. long; calyx 8 mm. long, the hirsute lobes linear-subulate; corolla finely pilose, funnelform above, the slender tube 3 cm. long, the ovate lobes 3 mm. long, reflexed; stamen tips and style exserted; fruit about 1.5 cm. long, 8 mm. thick.—Mostly after Nees v. Esenbeck; specimen (a single branchlet) named by Meyen,

described by Miers, had leaves 18 mm. long, 12 mm. wide, peduncles 16 mm. long.

Apurímac: Andahuaylas, *West 3719* (det. Johnston, *S. glandulosa*). —Cuzco: Marcapata, *Vargas 3752*.—Puno: Near Puno, *Vargas 1274; Soukup 88*. Granja Salcedo, *Mexia 7779* (det. Johnston). Near Pisacoma, about 5,000 meters, *Meyen*, type. Bolivia; to Colombia?

Salpichroa micrantha Benoist, Bull. Soc. Bot. France 85: 55. 1938.

Ex char. similar to *S. Gayi* but branches soon glabrous; petioles 11–12 mm. long; leaves ovate, triangular, obtuse or often lightly cordate at base, slightly inequilateral, obtuse, 15–17 mm. long, 11–14 mm. wide, glabrous both sides; flower pedicels 2–2.5 mm. long, glabrous (or nearly) as calyx, this 4 mm. long, sepals connate for lower third, the free part triangular lanceolate, acute; corolla glabrous, 8–9 mm. long, tube little narrowed below the middle, lobes 1.5 mm. long; anthers subsessile, 2 mm. long, in apex of throat. —Type (Paris) *Gay 1973*, without locality, not seen.

Cuzco: Yucay, *Soukup 750*.

Salpichroa ramosissima [Mathews] Miers in Hook. Lond. Journ. Bot. 4: 326. 1845.

A shrub with quadrate nodose branches (the branchlets pubescent) and geminate or ternate nearly glabrous elliptic-oblong subacuminate leaves, rounded at base but decurrent into slender petiole 12 mm. long; leaves submembranous, ciliate, in type to about 4 cm. long, 1.5–2 cm. wide; calyx lobes sublinear, slightly pilose; corolla tubular, contracted at throat, the subacute reflexed lobes marginally velutinous; berry red, oval, 2 cm. long, 12 mm. thick, the seeds hirsute.—Length of calyx and corolla in type not given but latter probably not more than 2–4 cm. long; name in herbaria by Mathews; very distinct, fide Miers, in form of leaves and corolla contracted in the throat (where usually widened). It seems doubtful that the contracted corolla throat and the narrow leaves are significant in comparison with *S. Weberbaueri*.

Lima: Puruchucu, (*Mathews 1053*, type).

Salpichroa tristis Miers in Hook. Lond. Journ. Bot. 7: 335. 1848.

Type a small depressed shrub with short (to 2.5 cm. long) slender tortuous nodose branchlets, geminate glandular-pubescent obovate leaves less than 6 mm. long, at least half as wide, and glabrous

nutant flowers about 1 cm. long; petioles 3 mm. long, compressed; calyx equally 5-parted, the lobes narrowly subulate, 4 mm. long; corolla tube 1 cm. long, 3 mm. thick, the short triangular lobes reflexed; stamens and style included from middle of tube; style slightly deflexed, incrassate apically, stigma concave; ovary disk fleshy.—Leaves when dry are black; branches gray, dotted. Type (Herb. Hooker) from Quito; cited next, *Maclean*, Peru Andes. In Peru at least leaves in wet season are larger. *S. alata* Damm., Meded. Rijks. Herb. 29: 26. 1916, of Bolivia might be sought here because of small flowers but the indument is glandular-pilose and the branchlets 1–3-alate.

Ancash: In rocks near Huaraz, *Weberbauer 2970;* 225.—Apurímac: Saxaihuamán, *Ferreyra 2630; 2652* (det. Cowan, with query).—Cuzco: Calca, *Vargas 157*.—Puno: Near Puno, *Soukup 445*. Without locality, (*Maclean*). Bolivia; Ecuador.

Salpichroa uncu [Dombey] Benoist, Bull. Soc. Bot. France 85: 55. 1938.

Sarmentose, type quite glabrous, the older branches not alate; petioles 10–14 mm. long; leaves ovate-lanceolate, obtuse or subcordate at base, often unequal, subacute, 22–32 mm. long, 14–20 mm. wide, the lateral nerves often near base, the 2 lower from base; pedicels 4 mm. long, calyx 7 mm. long, free nearly to base, sublinear, attenuate to acute tip; corolla 16 mm. long, upper half distinctly ampliate, at throat moderately and gradually constricted, lobes lanceolate-triangular from broad base, obtuse, 2 mm. long, style inserted in upper fifth of tube; filaments nearly as long as anthers, these 2 mm. long, attaining apex of throat, oblong, clearly attenuate; fruit baccate.—Benoist, l.c. 53–55, described two species from Ecuador, one from Colombia and one, *S. sarmentosa*, l.c. 55, from La Paz, Bolivia, *Mandon 436*, type. This is the most likely to occur in Peru; petioles 6–8 mm. long, leaves 1.5–2.5 cm. long, 12–24 mm. wide; pedicels 2–4, calyx 8, lobes 3, anthers 2 mm. long; branchlets alate, pubescent as pedicels, the leaves both sides and the sepals, these sublinear; corolla puberulent, distinctly ampliate; anthers oblong, affixed at apex of throat.

Ancash: Tallenga, *Ferreyra 7485* (det. Cowan, *S. diffusa*).—Lima: Acotama, *Dombey*, type. Matucana, *2945*. Río Blanco, *3041*.—Ayacucho: Above Puquio, *Ferreyra 5512; 7209* (det. Cowan, *S. diffusa*). Near Chavina, *Weberbauer 5785* (det. *S. diffusa*, Herb. Dahlem). Ecuador.

Salpichroa Weberbaueri Damm. Bot. Jahrb. 37: 640. 1906. *S. diffusa* Miers var. *longiflora* Hicken, Ap. Hist. Nat. Buenos Aires 1: 175. 1913.

Shrub with scandent minutely puberulent branches and ovate-cordate rather densely puberulent leaves, 1.5–3 cm. long, nearly as wide; pedicels 8 mm. long, puberulent; calyx lobes slightly pilose, 1 cm. long; corolla yellow, tubular-funnelform, 3.5 cm. long including the 3 mm. long ovate-acuminate lobes; filaments 1 mm. long, anthers 3 mm. long, style 3 cm. long.

Ancash: Near Ocros, *Weberbauer 2693*. Huarí, *Weberbauer 2936*.—Huancavelica: Pana, *Tovar 207* (det. Cowan, *S. diffusa*).—Cuzco: In fences toward Acomayo, *Vargas 4753* (det. Standley). Sicuani, *Cook & Gilbert 92;* (*Hicken*, type, var.).—Arequipa: Chachani, *Pennell 3266*. "Quitung-quitung," "nuno-nuno" (both, Cook & Gilbert).

12. JABOROSA Juss.

Dorystigma Miers in Hook. Lond. Journ. Bot. 4: 347. 1845. *Lonchestigma* Dunal in DC. Prodr. 13, pt. 1: 476. 1852.

Prostrate and creeping or rosette herbs with subentire or irregularly pinnatifid leaves and pediceled axillary funnelform or long tubular-funnelform yellow, blue or white flowers. Calyx campanulate, 5-lobed, little or not at all enlarged in fruit. Stamens attached above the middle of the tube, sessile or filaments free; stigma narrowly 2–5-lobed (type), clavate or broad and acute.—The segregate genus apparently was meant as a subgenus on the basis of the stigma character.

Jaborosa crispa (Miers) Hook. ex Wetts. Natur. Pflanzenf. 4, pt. 3b: 26. 1895. *Dorystigma crispa* Miers in Hook. Lond. Journ. Bot. 7: 333. 1848. *Lonchestigma crispum* (Miers) Dunal in DC. Prodr. 13, pt. 1: 477. 1852.

A glabrous or sparsely crisply pubescent cespitose plant with short prostrate or ascending stems; leaves subfasciculate, pinnately laciniate, the divisions shortly mucronate and sinuately dentate, about 6 cm. long and 2 cm. wide, decurrent into a petiole 2 cm. long or longer; peduncles 1 cm. long, bracts small, subulate; calyx as corolla white, 12–15 mm. long, glabrous without except for a few crisp trichomes, the throat woolly within; style shorter than the subexserted stamens; berry to 3 cm. in diameter.—*J. caulescens* Hook., 476, Bot. Misc. 1: 347, *pl. 71*. 1830, of Chile has more deeply

toothed leaf-lobes, much longer pedicels; however, there seem to be several closely allied species or variants as *J. leiocalyx* Damm., just south of Lake Titicaca, with bright blue corolla, cordate, bilobed stigma. Illustrated, Wedd. Chloris And. 2: 101, *pl. 57.* 1857.

Arequipa: Vincocaya, *Pennell 13346.*—Puno: Pomata, *Shepard 33* (det. B. L. Robinson). Arid punas, 3,900–4,000 meters, (*Weddell*). —Tacna: Volcan Tacora mountains, *Werdermann 1158.* Bolivia.

13. WITHERINGIA L'Hèr.

Ligneous, the leaves alternate or geminate, entire, the 4- or 5-merous flowers geminate or umbellate, the 1-flowered peduncles lateral, extra-axillary. Calyx dentate or parted. Corolla rotate-campanulate, parted, subvillous at filament attachment. Stamens exserted, anther dehiscence longitudinal. Style filiform, stigma capitate.—Longitudinally dehiscent anthers, lobed calyx not accrescent, and rotate corolla have been accepted as the diagnostic characters of the group; cf. *Capsicum.*

Witheringia microphylla Griseb. in Lechler, Bert. Ann. Austr. 58. 1857.

Glabrous except axillary fasciculate blooms and early an obscure puberulence on branchlet tips; leaves approximate, subsessile, oblong-lanceolate, to 2 cm. long, 7 mm. wide, often smaller, lustrous; pedicels 8–10 mm. long, subangulate, with a cupulate collar at base; calyx 1.5 mm. long, 3 mm. across, the lobes rounded, not at all accrescent but irregularly cleft in fruit; corolla 7 mm. long, at least as broad across the top, the broadly rounded lobes about 4 mm. long, 3 mm. wide; berries black, to 1 cm. in diameter.—A shrub about 1.5 meters tall, with fleshy coriaceous subimbricate leaves, the purplish corollas fulvous tomentulose. Determinations by Standley. F.M. Neg. 2542.

Apurímac: In rocks and humus, Marcapata, 4,100 meters, *Vargas 1361; 9716.*—Cuzco: Marcachea, *Vargas 11178.*—Puno: Macusani, *Lechler 2645,* type.

14. CAPSICUM [Tourn.] L.

Bassovia Aubl. Pl. Guiana 1: 227, *pl. 85.* 1775, in part; *Witheringia* in litt. vix L'Hèr. Sert. Ang. 1: 33, *pl. 1.* 1788? 402. *Brachistus* Miers, Ann. Mag. Nat. Hist. ser. 3, 2: 264. 1849; 682. *Fregirardia* Dunal,

l.c. 502; 688. *Aureliana* Sendt. in Mart. Fl. Bras. 6: 138. 1846, fide Bitter.

Reference: Dunal in DC. Prodr. 13, pt. 1: 402–429, 1852, incl. synonyms, these at least as to Peru.

Simulates many species of *Solanum* vegetatively but the anthers dehiscent longitudinally; leaves often geminate, one smaller; calyx truncate and entire or with 5 (rarely 10) more or less developed marginal teeth, little or not accrescent. Flowers always solitary on axillary or subaxillary pedicels, these one to many.

Heiser and Smith, Brittonia 10: 194. 1958, quote Morton who said (in Standley's "Flora of Costa Rica," 1938) that the genus should include those species with free glabrous filaments and a shiny pungent berry, while Standley suggested omitting those with soft pulp-filled, non-pungent berries; this was concurred in by Heiser and Smith. The generic names cited above as synonyms may not apply except as regards Peruvian plants referred to them; and these, for convenience, are included here, yet it seems probable that one generic name will be found to express their basic unity. Apparently a good example of the futility of maintaining *Brachistus* distinct (from *Capsicum*) is found in Witasek, Bot. Exped. Sudbrazil Wien. 9. 1910; her illustrations of the species *Bassovia Wettsteiniana*, *C. ramosissima*, and *C. recurvatum* point up the confusion resulting from the generic definition of plants probably all belonging to one group, that is, *Capsicum*. Simulation to *Solanum*, section *Lycianthus*, is sometimes nearly exact except for anther dehiscence; *C. lycianthoides* Bitter is one example, but the slender calyx teeth are quite marginal.

A. T. Hunziker, Darwiniana 9: 225–247. 1950, gave a careful account with notable etchings by Alfredo E. Cocucci of the species of Paraguay and Argentina; he restricted the genus to the interpretation of Bentham and Hooker and Wettstein, indicating later judgment on the inclusion of *Bassovia* Aublet, *Brachistus* and *Poecilochroma* Miers as by Kuntze, Rev. Gen. 447. 1891, or *Bassovia* in part as subgenus *Aureliana* (Sendt.) Bitter, Repert. Sp. Nov. 17: 331. 1921. Whatever the ultimate definition of these groups calyx and corolla doubtfully exhibit significant characters: as constituted, *Sicklera* Sendt., Flora 178. 1846, has funnelform corolla, limb deeply parted, calyx truncate, apparently also setaceous; *Brachistus*, subrotate corolla, limb 4–5-parted, calyx 5-lobed (type) or entire; *Aureliana*, limb 5-parted, calyx 5-lobed; *Decamerus*, corolla rotate-campanulate, calyx with 5–10 setae; obviously these characters, if salient by them-

selves, must result in the division of *Solanum* L. into several groups. Of course, they may have at least sometimes supporting elements.

Charles B. Heiser, Jr., and Paul G. Smith, Amer. Journ. Nat. 38: 362–368. 1951, reviewed the genetics of the cultivated species; basic chromosome number is 12 (Darlington & Yanaki, Chromosome Atlas Cultiv. Pls. 1945); diploid number for *C. pubescens* Ruiz & Pavón is 24 (Heiser & Smith); for an interesting and informative account of the cultivated Capsicum peppers by the latter students see Economic Botany 7: 214–227. 1953, with an extensive bibliography; their apparently correct taxonomic conclusions indicate the futility of proposing new species in other groups, even in *Solanum*, without genetic understanding of at least some obviously distinct entity.

Ruiz and Pavón noted both *C. frutescens* L. and their *C. pubescens*, "arnacucho" and "iocotto," as very abundant; prehistoric peppers have been found in the burial sites of Ancón and Huaca Prieta; Herrera recorded several cultivated varieties (*C. pubescens*) in Cuzco. Pungent (Chile) peppers spread widely in Europe only after Columbus, who, according to Peter Martyns, writing in 1493, brought home a pepper more pungent than that from the Caucasus. Paprika (bland), cayenne (pungent) and chili are all the dried ground fruit of Capsicum; chili powdered is ordinarily a mixture of pungent pepper with other flavorings as oregano, garlic and salt. The tasty appetizer, the hot sauce or "aji"—"rojo" or "amarillo," the latter milder, sweeter—(any pungent pepper moistened usually with oil and vinegar), so popular in Peru especially with the flavorful locally grown "papas," is one of several of these condiments. Herrera recorded native names probably referable to more than one cultivated species: "Marati," "chinchi-ucho" (both Valle de Santa Ana); "quiton-quiton" (Marcapata); "piris" (in all valleys); "ccascca-pupu," "sempiri" (Urubamba).

KEY TO CAPSICUM

(after Heiser and Smith as to cultivated species)

Calyx teeth 10, unequal..... (*C. brachypodum*), *C. Eggersii.*

Calyx teeth 5 (rarely 7) or lacking, rarely unequal.

Flowers many in axillary fascicles, 4–5-merous.

Leaves glabrate.....*C. macrophyllum.*

Leaves canescent pilose.....*C. molle.*

Flowers solitary, geminate or few.

Pedicels filiform, 2–2.5 cm. long; flowers hirtellous.....*C. molle.*

Pedicels shorter or at least flowers glabrous unless lobes marginally.

Leaves rather ovate; pedicels in any case usually short.

Calyx dentate, the teeth 1 mm. long or longer, erect; leaves beneath, pedicel, calyx somewhat pubescent.

Corolla small, glabrous, on 3–8 pedicels 10–20 mm. long. *C. mendax.*

Corolla 1.5–2 cm. long, villous, the 1–2 pedicels 2–3 cm. long.....*C. pendulum.*

Calyx truncate, rarely 5-protuberant, or teeth to only 0.5 mm. long or recurved; plants glabrous or more or less pubescent.

Corolla lobes purple; seeds black; leaves rather rugose-nerved.....*C. pubescens.*

Corolla lobes as seeds pallid, the former rarely purple; leaves plane.

Corolla throat as anthers rather yellow or tan; berry red.....*C. pendulum.*

Corolla yellow all over; berry green.....*C. Haughtii.*

Corolla uniformly colored; anthers usually bluish or purple.

Corolla greenish-white or -yellow; pedicels usually 2–5.

Pedicels stout, usually declinate; corolla lobes sub-erect.....*C. sinensis.*

Pedicels slender, erect; corolla lobes spreading. *C. frutescens.*

Corolla clear or sordid white, rarely purple; pedicels solitary (typical).....*C. annuum.*

Leaves lanceolate, attenuate both ends; pedicels to 2 cm. long. *C. lanceaefolium.*

Capsicum annuum L. Sp. Pl. 1: 270. 1753; 412.

Similar to *C. frutescens* but pedicels rarely two, ordinarily only 1 fruit developing at a node and corolla not tinted, rarely purple; fruit nearly always larger.—Perhaps not found in Peru, collections referred to it apparently rather *C. frutescens* L., most commonly

cultivated in northern areas. Illustrated, Heiser & Smith, Economic Bot. 7: 223 (fruits); also Irish, Rep. Mo. Bot. Gard. 9 (many plates hort. vars.).

Peru (cf. note above). Domesticated species.

Capsicum Eggersii Bitter, Repert. Sp. Nov. 18: 126. 1922.

A very leafy sparsely pubescent shrub a meter or two high with small brownish-yellow flowers borne on slender peduncles 1–1.5 cm. long; petioles 3–5 mm. long; leaves obliquely oblong to lanceolate, cuneate to base, acutely acuminate, 4.5–8 cm. long, 1.5–3.5 cm. wide, membranous, glabrate, lateral nerves 6–7; calyx 7 mm. long, the 10 unequal setaceous teeth subglabrous, 4 and 5 mm. long; corolla campanulate-rotate, about 6 mm. long, the ovate lobes 3 mm. long; filaments 1.5 mm. long, anthers emarginate, 1–1.3 mm. long, stigma bilobed.—Leaves thin, tapering into the broadly winged scarcely distinct petiole. Related to *C. brachypodum* (Dunal) Ktze., Rev. Gen. 2: 450. 1891, of Ecuador (type from Guayaquil); it has pedicels only 2–6 mm. long, calyx 4–4.5 mm. long, the 10 linear subulate teeth 3–3.5 and 2 mm. long, corolla 7–7.5 mm. long, filaments 2 mm. long, anthers cordate, 0.8 mm. long, leaves rather densely pubescent with many-celled trichomes (Bitter, l.c. 17: 333. 1921). *C. lycianthoides* Bitter, l.c. 332, has leaves oblique at base, petioles to 1 cm. long, pedicels 8 or 9 mm. long, calyx 2 mm. long, teeth 5, glabrate, linear-subulate, 4–5 mm. long. *S. chacoense* Hunziker, Darwiniana 9: 228. 1950, has very unequal calyx teeth, 0.5–1.5 mm. long.

Tumbez: Hacienda La Choza, Prov. of Tumbes, *Weberbauer 7684*. Ecuador.

Capsicum frutescens L. Sp. Pl. 189. 1753; 413.

Glabrous or slightly pubescent; leaves solitary or geminate, ovate, acuminate, often a dm. or so long, 3–4 cm. wide; pedicels usually 2–5, erect in fruit, somewhat incrassate above, 1.5 cm. long or often longer; calyx costate, cyathiform, in fruit suburceolate, teeth reduced; corolla white, whitish or yellowish, the lanceolate acute lobes widely spreading; anthers blue-violet, longer than filaments; fruit oblong-ovoid, reddish, smooth, lustrous, 2-celled, the calyx appressed; seeds glabrous, smooth, reniform.—More common in the southern hemisphere than *C. annuum* L. (Heiser & Smith). Calyx 5-pointed or subdentate, the teeth at most 0.5 mm. long; the common form is var. *baccatum* (L.) Irish, Rep. Mo. Bot. Gard. 9: 99. 1898.

San Martín: Tarapoto, *Woytkowski 35161*. Juanjuí, *Klug 4248* (det. Standley).—Huánuco: Near Huánuco, *Stork & Horton 9462; 9463* (det. P. G. Smith). Pozuzo, *Ruiz & Pavón*. Tingo María, *Ferreyra 922*.—Loreto: Palta-cocha, upper Río Nanay, *Williams 1270* (det. P. G. Smith). Domesticated species. "Arnaucho" (Ruiz & Pavón).

Capsicum Haughtii (Svenson) Macbr., comb. nov. *Brachistus Haughtii* Svenson, Amer. Journ. Bot. 33: 480, *pl. 19, fig. 2*. 1946.

Type a small shrub (5 dm. tall), the terete or subangulate branches with gray or reddish bark, the strict branchlets yellowish pubescent as the leaf-nerves on both surfaces; leaves alternate or on short branchlets, congested, ovate, entire, 1–2.5 cm. long, 4–9 mm. wide, acute or obtuse, attenuate at base sometimes into petiole 2 mm. long; peduncles axillary, solitary; calyx pubescent, slightly 5-angled, 3–4 mm. broad, with 5 minute recurved teeth below the margin angles; corolla rotate, plicate, yellow, 1 cm. across, the limb 5-dentate; stamens included; style stout, stigma capitate; berry globose, 1–5 mm. in diameter, green, the 7 seeds brownish-yellow.—After author, who suggests that relationship is with *B. Hookeriana* Miers, Ann. Mag. Nat. Hist. ser. 2, 3: 262. 1849, of Guayaquil with much larger leaves; the plate, opposite page 485, shows ellipsoid anthers, presumably dehiscent longitudinally.

Piura: Forming little thickets on grassy summit of Cerro Prieto, Amotape Hills, (*Haught & Svenson 11621*, type, Brooklyn Bot. Gard.).

Capsicum lanceaefolium (Miers) Ktze. Rev. Gen. 2: 449. 1891; 689. *Brachistus? lanceaefolius* Miers, Ann. Mag. Nat. Hist. ser. 3, 2: 267. 1849.

A shrub with rusty-tomentose branches, dichotomous, divaricate flexuous subherbaceous branchlets, petioles 8–10 mm. long, lanceolate leaves acuminate at both ends, fulvous puberulent especially beneath, 7–9 cm. long, 2.5–3.5 cm. wide; petioles 8–12 mm. long; pedicels 18 mm. long, solitary or 3–4-fasciculate, axillary, 1-flowered; calyx urceolate, subentire, 16 mm. across, angled, pilose, with 5 minute teeth; corolla rotate, nearly 2 cm. wide, the acuminate lobes floccose on the margins; stamens included, erect, glabrous; style incrassate, stigma capitate-bilobed.—Locality given as "Vita," probably an error; may not be a *Capsicum* but apparently, ex char. and from drawing, Miers, Ill. S. Amer. Pl. 2: *pl. 36*.

Junín: Vitoc, (*Maclean*). Ecuador.

Capsicum macrophyllum (HBK.) Standley, Journ. Wash. Acad. Sci. 17: 16. 1927; 402. *Witheringia macrophylla* HBK. Nov. Gen. & Sp. 3: 13. 1818. *Brachistus macrophyllus* (HBK.) Miers, Ann. Mag. Nat. Hist. ser. 3, 2: 263. 1849. *C. solanaceum* (L'Hér.) Ktze. var. *macrophyllum* (HBK.) Ktze. Rev. Gen. 2: 450. 1897; var. *pubescens* Ktze. l.c.

A tall coarse more or less pubescent herb or ligneous below, the upper geminate leaves with many slender unequal pedicels, 12 (20) mm. long, in their axils; petioles often very narrow, 2–3 cm. long; leaves to 2 dm. long, 7–10 cm. wide, the smaller of each pair half as large, all glabrate or early pilosulous, membranous or firm, sublustrous above, nervose and paler beneath; calyx short, urceolate, 4-dentate; corolla subcampanulate, a few mm. long and wide, the lanceolate acute lobes spreading; stamens 4, inserted in throat, subexserted, anthers yellowish, ovate, filaments villous; berry red, spherical, about 6 mm. thick, seeds granulose.—"*B. tetrandrus* (Br. & Bouché) B. & H." for *Ule 6242* fide Dammer is a name not found by me. *C. solanaceum* (L'Hér.) Ktze. has much larger flowers.

San Martín: San Roque, *Williams 7808*.—Huánuco: North of Tingo María, *Stork & Horton 9566*. Pampayacu, *5032*. Cayumba, *Ferreyra 6740*.—Junín: Near La Merced, *5803*.—Loreto: Iquitos, *Ule 6242* (det. Dammer, *B. tetrandrus*). Río Mazán, *José Schunke 69* (det. Standley). La Victoria, *Williams 2762*. Nanay, *Williams 327*. Bolivia to Panama and Venezuela. "Toe-mullaca" (Williams).

Capsicum mendax (van Heurck & M. Arg.) Macbr. Candollea 5: 402. 1934. *Solanum mendax* van Heurck & M. Arg. in van Heurck Obs. Bot. 61. 1870.

Branchlets, leaves beneath and calyces rather densely short pilose; leaves ovate, cuneate to base, rounded to acute tip, 2–3 cm. long, about 1.5 cm. wide, lightly crisp-pubescent above; flowers in fascicles of 3–8; pedicels 10–12 mm. long, slender; calyx campanulate, the tube about 1.5 mm. high, the 5 oblong-subulate teeth a third as long, not accrescent in fruit; corolla glabrous, 4 mm. long, about as wide, that is, campanulate, rounded-lobed about one-third; style as long; anthers nearly 1.5 mm. long.—F.M. Neg. 22899.

Solanum mendax van Heurck & M. Arg. l.c. was based on *Spruce 5050* from Ecuador and not from Peru as listed in Kew Index. According to Bitter, Repert. Sp. Nov. 17: 332. 1921, it is a species of *Capsicum*, section *Aureliana* (Sendt.) Bitter.

Cajamarca(?): *Weberbauer 6051*.

Capsicum molle (HBK.) Ktze. Rev. Gen. 2: 450. 1891; 505. *Witheringia mollis* HBK. Nov. Gen. & Sp. 3: 15. 1818. *Brachistus mollis* (HBK.) Miers, Ann. Mag. Nat. Hist. ser. 3, 2: 264. 1849. *Fregirardia mollis* (HBK.) Dunal in DC. Prodr. 13, pt. 1: 505. 1852.

A slender tortuous-stemmed shrub with geminate ovate acuminate leaves canescent tomentose beneath and 2–4 small flowers in the upper axils solitary on filiform pedicels 2–2.5 cm. long, these erect in fruit; petioles 6 mm. long; leaves membranous, reticulate-veined, sparsely pubescent above, 3.5–5 cm. long, 2–2.5 cm. wide, one of each pair stipuliform or much smaller; calyx urceolate, villous, 5-dentate; corolla rotate, hirtellous, limb plicate, angled, teeth acute; filaments sometimes 6, short, glabrous, anthers oblong, obtuse, somewhat exceeded by the straight style, stigma subcapitate; berry subglobose, glabrous.—*Williams 7808*, imperfect or moldy, apparently belongs here but flowers many, leaves twice as large. F.M. Neg. 2877.

Cajamarca: Near Cajamarca, *Bonpland*, type.—San Martín: San Roque, *Williams 7808*.

Capsicum pendulum Willd. Hort. Berol. 1: 242. 1809; 425.

More or less ligneous, glabrate or lightly (early more densely) pubescent; leaves ovate or oblong-ovate, acuminate, 2.5–5 cm. long or larger; peduncles solitary or geminate, incrassate apically, erect but calyx (and fruit) more or less recurved or reflexed; calyx truncate but with 5 (6) erect subobtuse teeth; corolla whitish but more or less seriately yellowish or tan, spotted or blotched within; fruit suboblong, red, smooth or rugose.—According to Heiser and Smith this has the floral characters of *C. microcarpum* Cav., Gen. & Sp. Pl. 371. 1803, probably (cf. Hunziker, 239) DC. Cat. Hort. Monsp. 1813, and *C. Schottianum* Sendt. in Mart. Fl. Bras. 106: 143–144. 1896, both natives of southern South America, not Cuba (as Cavanilles thought; Hunziker, 239–240). Hunziker describes the specimen of De Candolle: calyx teeth about 1 mm. long, corolla white with a pair of yellowish spots at base of lobes (these 2.5 × 2 mm.), anthers yellow, 1.8 mm. long, shorter than filaments, the appendages obscure, not free; fruit suboblong; *C. Schottianum*, similar, but calyx teeth obsolete, fruit globose; both illustrated, Hunziker, figs. 4 and 5. The geneticists concluded: *C. pendulum* Willd. probably will prove to be a cultivated form of one of these species, in this case, *C. microcarpum* Cav. Illustrated, Heiser & Smith, Economic Bot. 7: 222 (fruits); 224 (flowers).

In coastal Peru one of the most popular of the cultivated peppers (Heiser & Smith).

Junín: Puento Yessup, *Killip & Smith 26351; 26386* (both aff. *C. Schottianum* fide Heiser). Brazil to Chile and Ecuador (Heiser).

Capsicum pubescens R. & P. Fl. Peruv. 2: 30. 1799; 421.

Said to become suffrutescent, in any case always pubescent; stems angulate, often purplish at nodes, dichotomously branched; leaves solitary or geminate, ovate, obliquely acute, very veiny, opaque, the larger mostly 4–7 cm. long, about half as wide or larger; peduncles incrassate above, early erect, usually 1-flowered, longer than the somewhat recurved petioles, or to 1.5 (2) cm. long; corolla imbricate, the plaits between lobes distinct, the latter not joined apically in bud; filaments subfiliform; fruits yellow, orange (or red?), to about 1.5 cm. in diameter; seeds purple-black, curved or wrinkled.—*West 3739* is densely yellowish-pilose; Cook & Gilbert and Williams specimens are glabrate. After, in part, Heiser and Smith, Proc. Amer. Soc. Hort. Sci. 52: 331–335, 1948, who determined diploid number as 24 and contrasted characteristics with *C. frutescens* L., suggesting that besides color of flowers, dull leaves, open buds and conspicuous corolla folds, the species may have a different response to length of day. *C. guatemalense* Bitter, Repert. Sp. Nov. 21: 377. 1924, included in *C. pubescens* R. & P. by Heiser, has as to type 5 (rarely 7) subequal linear-subulate calyx teeth 2.5–3 mm. long, in this character at least suggesting *C. Eggersii* Bitter as author noted, with, however, as to type, 10 calyx teeth. Also similar is the Ecuadorian *C. lycianthoides* Bitter, l.c. 17: 332. 1921, with 5 linear-subulate calyx teeth 4–5 mm. long; all these plants have glands within the calyx and more or less plicate corollas, and their variations—potential or true character—await genetic investigation. Charles M. Rich gave a useful general account of this interesting plant, Bull. Mo. Bot. Gard. 38: 36–42. 1950. Illustrated, Heiser & Smith, l.c. *fig. 1* (plant, flower bud, fruit, seeds).

Huánuco: Pozuzo, *Ruiz & Pavón*, type.—Junín: Cultivated, Panatahuas, *Ruiz & Pavón*.—Loreto: San Antonio, Río Itaya, *Williams 3405*.—Apurímac: Cultivated in garden of Dr. Octano Usandivaras, *West 3739* (det. Hunziker).—Cuzco: San Miguel, Urubamba Valley, *Cook & Gilbert 1017* (det. P. Smith). To Mexico. "Roccoto" (Ruiz & Pavón); "uchu," "aji" (Williams).

Capsicum sinensis Jacq. Hort. Vind. 3: 38, *pl. 67*. 1776; 413. *C. toxicarium* Poepp. ex Fingerh. Monog. 32. 1832?

Stems, leaves essentially glabrous, rarely shortly pubescent; leaves ovate to ovate-lanceolate, to 1.5 dm. wide, smooth or rugose, light to dark green; flowers 3–5 per node (except depauperate individuals), pedicels declinate, rarely erect, at anthesis relatively short, thick, ratio width to length of pedicels one-eighth to less than one-fifteenth; calyx teeth none, constriction base of calyx marked (rarely faint); corolla greenish-yellow, rarely white, 0.5–1 cm. long, lobes not spreading, usually with conspicuous folds at sinuses, sometimes long-attenuate, folds lacking; anthers blue to purple (yellow); fruits 1–12 cm. long, smooth or wrinkled, orange, yellow, red or brown; seeds usually wavy-margined.—*C. pubescens* has purple corolla, black seeds, *C. pendulum* yellow-spotted corolla, yellow anthers; in *C. frutescens*, pedicels long, slender, ratio one-twentieth, erect, corolla lobes spreading or recurved; *C. annuum*, pedicels solitary, corolla white. Has been collected in Piura, Lima, Huancayo, Iquitos, Tingo María (Smith & Heiser).

Peru: See list of localities above; known only in cultivation or adventive.

15. DATURA L.

Brugmansia Pers. Syn. 1: 216. 1805.

Reference: Safford, Journ. Wash. Acad. Sci. 11: 173–189. 1921.

Shrubs, trees or herbs with large solitary erect or pendulous funnelform-campanulate flowers. Calyx long-tubular, sometimes spathe-like, deciduous with the corolla or circumscissile at base leaving a disk that enlarges beneath the fruit, this sometimes prickly, 4-valved, 4-celled except at 2-celled top. Filaments and style capillary, the stamen bilobed. Ovary 2-celled, or pseudo-4-celled (Safford) but each of the 2 cells is partitioned by placenta walls.—The following résumé was compiled before the appearance of "The Genus Datura" by A. F. Blakeslee (The Ronald Press Company, New York, 1959), including a genetic investigation by Avery, Satina and Rietsema and a "Review of the Taxonomic History of Datura," by Satina and Avery and a summary of nomenclature by Marie Hèléne Sachet; the nomenclatorial notes by Fosberg, Taxon 8: 52–57. 1959, have been noted. The Fosberg and Barclay papers cited appeared while the above reference was in press. Arthur S. Barclay was reported to be preparing a much needed revision of the genus, unfortunately not available now (1959); accordingly this résumé of Safford's work has been done without inclusion of recent materials. It seems to be

agreed that more studies are needed to clarify the taxonomy, but without doubt the most confusing and unsettled problem is the taxonomy of the *Brugmansia* group; these students preferred Safford's order of sections. Ciro Napanga Agrero, Bol. Mus. Hist. Nat. 7: 228–235. 1943, gave an interesting account of El Floripondio with two fine photographs.

For an informative account of the use of the narcotic seeds in ceremonial rites see Safford, Ann. Report Smithsonian Inst. 1920: 537–567. 1922, including illustrations of the following species, except *D. cornigera.*

KEY TO DATURA

Species and characters dubious; perhaps hybrids exist.

Plants herbaceous; ovary (fruits) subaculeate, rarely smooth.

Entire plant glabrous.....*D. stramonium.*

Stems, often leaves, somewhat villosulous.....*D. inoxia.*

Shrubs or trees; fruits tomentulose.

Corolla red or yellowish-red, subtruncate but with points to 1.5 cm. long; stamens free; calyx subequally lobed....*D. sanguinea.*

Corolla white, greenish-yellow, rarely reddish suffused, the points often longer than 1.5 cm.; calyx somewhat spathe-like and extended.

Calyx obscurely spathaceous, unless in age subequally lobed; stamens early agglutinate or free.

Fruit ovoid; corolla scarcely 2 dm. long; lobes little defined. *D. arborea.*

Fruit oblong-cylindric; corolla 2.5–3.5 dm. long; lobes defined, sinuses rounded or notched.....*D. candida.*

Calyx clearly spathaceous, one side long extended, finally hamate; corolla points 2–4 cm. long; stamens free.....*D. cornigera.*

Datura arborea L. Sp. Pl. 1: 179. 1753; 183.

A shrub or small tree; leaves softly pubescent; calyx spathe-like, deciduous in fruit; corolla white, 15–18 cm. long, with distinct sinuses or notches between the lobes; peduncle velvety-pubescent; calyx caducous, often 6.25 cm. long; fruit ovoid.—The type came from Peru. Often cultivated and highly regarded like *D. candida* (Pers.) Pasq. with which it is confused and to which some of the following references may apply; this may be the same.—*D. arborea* of Ruiz and

Pavón (Fl. Peruv.) was an incorrect determination for *D. arborea* L.; the Ruiz and Pavón plant is *D. candida* (Pers.). For illustrations of this species see Safford, Ann. Report Smithsonian Inst. 1920: *pls. 9, 10.* 1922.

The leaves are used as poultices to relieve pain and hasten suppuration.

Cuzco: Urubamba Valley, *Herrera 1536* (166).—Junín: Valley of the Chanchamayo between Huacapistana and Palca, (*Weberbauer*, 247). "Floripondio," "campanchu," "toe" (Williams).

Datura candida (Pers.) Pasq. Cat. Ort. Bot. Nap. 36. 1867; 182. *Brugmansia candida* Pers. Syn. 1: 216. 1805. *D. arborea* L. as to R. & P. Fl. Peruv. 2: 15, *pl. 127.* 1799.

Distinguished from *D. arborea* by the large flowers, 2–3 dm. long, rounded between the points, and the long-cylindrical pointed fruits; calyx short, lax, somewhat pointed, more or less persisting.—Like *D. arborea* known only in cultivation or at least in the vicinity of habitations, unless Weberbauer's collection represents a "wild" state.

Tumbez: Deciduous bushwood on a brook, mountains east of Hacienda Chicama, Prov. of Tumbez, *Weberbauer 7656.* Also provinces of Cercado, Chancay and Huánuco according to Ruiz and Pavón.—Cajamarca: Near Socota, *Stork & Horton 10177.*—La Libertad: Cachicadán, *Stork & Horton 9948; 9950.*—Junín: Puerto Yessup, *Killip & Smith 26355.*—Loreto: Michuyacu, *Klug 842.* Yurimaguas, *Williams 5275.* La Victoria, *Williams 2646.* Caballo-cocha, *2395.* —Cuzco: Prov. Convención, *Soukup 811.* Alto Urubamba, *Diehl 2498.* "Floripondio," "campanilla," "almizclillo."

Datura cornigera Hook. Bot. Mag. *pl. 4252.* 1846; 183.

A softly pubescent shrub or small tree with white flowers well-marked by the widely spreading corolla-limb with greatly elongate "points" and by the tapering horn-like apex of the calyx; corolla at first greenish-yellow, 15–18 cm. long, the caudate tips 4 cm. long; filaments free, hirsute below, anthers 2.5 cm. long; fruit nearly 1.5 dm. long, about 4 cm. thick.—Calyx of our specimen not obviously costate and the calyx-beak not quite as long as illustrated. Stands out distinctly beside typical *D. arborea* L. because of smaller green-streaked corolla, different and stronger odor (Stork and Horton as to *9948*); corolla yellow but appearing red at a distance because distal part is rose-red (*Stork & Horton 9950*); both collections around

habitations. *Isern 2013* from Queguena, Arequipa, appears to be this species, or all Peruvian specimens may represent a new species or *D. rubella* Safford, l.c. 185, of Ecuador, the corolla however, described as red, 13–14 cm. long.

Huánuco: Appearing as wild in remote sunny places, Muña, *4061?* Mexico.

Datura inoxia Miller, Gard. Dict. ed. 8, no. 5. 1768; 179. *D. guayaquilensis* HBK. Nov. Gen. & Sp. 3: 8. 1818, fide Svenson, with query. *D. meteloides* DC. ex Dunal, Prodr. 13, pt. 1: 544. 1852, fide Barclay, Bot. Mus. Leaflets 18: 245–255. 1959.

Cinereous-puberulent or pruinose annual; leaves ovate, acute or rounded at base, undulate, rarely subdentate; peduncle erect, 1 cm. long; calyx to 8 cm. long, lobes acuminate, unequal; corolla 1 dm. or longer, shortly 8–10-cusped.—Name, in silly "correction" has been written "innoxia." White corolla 1.5 dm. long, leaves, more or less covered with soft down, variously angled, fruit spines relatively soft (Svenson). Type from seeds obtained at Vera Cruz, Mexico. Illustrated, Barclay, l.c. *pls. 50, 51, 52.* F.M. Neg. 30800 (*D. meteloides*).

Piura: Parinas Valley, *Haught 271.* East of Capo Blanco, *Haught 189.* To Colombia and Venezuela; Paraguay.

Datura sanguinea R. & P. Fl. Peruv. 2: 15. 1799; 187. *Brugmansia bicolor* Pers. Syn. Pl. 1: 216. 1805.

The only known species in Peru with dark red flowers shading into a yellow tube; leaves entire or repand, puberulent; peduncle slender; calyx about half the length of the corolla or less, with two (later more) acuminate teeth; corolla 2 dm. long, lightly pubescent, the limb about 7 cm. wide; filaments pubescent below; anthers 1.5 cm. long; fruit often in persisting calyx, smooth, seeds verruculose.—A small tree growing at 3,000 to 4,000 meters. The specimens from southern Peru may represent a distinct species. Although referred here by Safford they are described by him as having obtuse calyx-teeth, glabrous flowers 2.5 dm. long and anthers 2.5 cm. long. *D. Rosei* Safford, l.c. 188, of Ecuador has upper leaves angular-dentate, densely tomentose.

An ointment with reputed healing properties is prepared from the bruised leaves and a narcotic and intoxicating drink called "Tonga" is made from the seeds, which, according to Tschudi, may not only stupefy but cause insanity.

Amazonas: Guayabamba and Chachapoyas, *Woytkowski 7; Soukup 4122.*—Ancash: Near Pichín, *Weberbauer 2926* (det. Dammer). —Huánuco: Chinchapalca, pueblo above Mito, *1601.* Huánuco, *Kanehira 224?*—Junín: Tarma, *Ruiz & Pavón,* type. Huancayo, at 3,317 meters, *Soukup 3976.*—Cuzco: Cultivated, (*Herrera, 166*). Ollantaitambo, (*Cook*). Also at Tarma, Xauza, Huarochera, Canta and Huamalies, (*Ruiz & Pavón*).—Puno: Asiruni, *Soukup 927.* Ecuador. "Puca campacho," "floripondio encarnado" (Ruiz & Pavón); "campanillas encarnadas."

Datura stramonium L. Sp. Pl. 179. 1753.

A bushy annual glabrous weed with ovate angulate dentate leaves, tubular, usually white flowers 7–10 cm. long, 5-lobed, and erect, usually shiny pods.—Var. *tatula* (L.) Torr. is purplish-tinged, including the corollas, and the prickles of capsules are often subequal. According to Herrera the root of *D. stramonium* is smoked with tobacco as a remedy for asthma.

San Martín: Tarapoto, *Williams 5856.* Juanjuí, *Klug 4198.*—Huánuco: Along ditches in Huánuco, *2332; Ruiz.* Ollantaitambo, *Herrera 3456.* "Chaminco," "chamico."

16. MARKEA Rich.

Dyssochroma Miers, Ann. Mag. Nat. Hist. ser. 2, 4: 250. 1849; also *Ectozoma* Miers, l.c. 191, at least as to Peru, fide Cuatrecasas.

Reference: Cuatrecasas, Repert. Sp. Nov. 61: 74–83. 1958.

Shrubby, more or less scandent, the long branches often pendent, the flowers red, showy, solitary or several in racemes, or panicles. Calyx tubular or campanulate, often angulate, 4–5-dentate or parted. Corolla more or less ampliate, the tube short or elongate, the 5 imbricate lobes equal or somewhat unequal. Anthers subsessile or on elongate filaments, perhaps always from a scaly or pubescent base, dehiscence longitudinal. Fruit baccate-capsular, 2-celled, oblong or subconical, seeds many, imbricate.—Persoon changed the name (often *Marckea* in litt.) to *Lamarckia* but the reference to the famous naturalist is obvious; Cuatrecasas followed Richard. Peruvian species are sparsely branched epiphytes with short to greatly elongate internodes often sheltering ants. Seeds with straight embryo (unknown for *Ectozoma?*); genus therefore in tribe *Cestreae.*

Flowers small, pale; leaves glabrous.....*M. Ulei.*

Flowers large, dark-colored, at least within; leaves ciliate.
M. formicarum.

Markea formicarum Damm. Bot. Jahrb. 37: 170. 1905; 80.

Type described as tuberiferous; petioles a few mm. to 1 cm. long; leaves lanceolate, acuminate, 8.5–18 cm. long, 3–7 cm. wide, few-nerved, glabrous except long-ciliate margins; flowers 1–several or sometimes solitary at branchlet tips; pedicels 1.5 cm. long, incrassate above, pulverulent as calyx, this with lanceolate caudate-acuminate lobes to 23 mm. long, 7 mm. wide (acumen 1 cm. long, ciliate); corolla bilabiate, 6.5 cm. long, cylindric tube 1 cm. across, below the middle narrowed to base where 2 mm. across, the 3 smaller lobes of limb rounded, the 2 larger obovate, denticulate; stamens at 2.5 cm. above base, equal, filaments 12 mm. long, villous near dilated base, anthers linear, subsagittate, 1 cm. long; ovary set in a 5-crenulate annular disk; style filiform, incrassate toward capitate stigma; capsule oblong, 1.5 cm. long, 1 cm. thick, the seeds 2.5 mm. long, 1 mm. thick.—Given an herbarium name by Spruce in reference to the conspicuous ciliation. Illustrated, Karsten & Schenck, Veg. 3, Reihe, 1: *pl. 4.*

Loreto: Mishuyacu near Iquitos, *Klug 243; 808; Killip & Smith 29973.* Amazonian Brazil; Colombia.

Markea Ulei (Damm.) Cuatr. Repert. Sp. Nov. 61: 78. 1958. *Ectozoma Ulei* Damm. Bot. Jahrb. 37: 170. 1905. *E. Pavonii* Miers, Ann. Mag. Nat. Hist. ser. 2, 4: 191. 1849; Ill. S. Amer. Pl. 2: 43, *pl. 48.* 1849–57?

Terete branches often rooting; petioles 5–12 mm. long; leaves membranous or fleshy-coriaceous, lanceolate to spathulate or obovate to rounded, often 0.5–1.5 dm. long, about 2–4.5 cm. wide, rounded or attenuate at base; inflorescences racemose-cymose in upper axils, pedicels about 1 cm. long, puberulent as the calyx, this irregular-margined, 5 mm. long, 2 mm. across; corolla greenish-yellow or white, hypocrateriform-campanulate, about 7.5 mm. long, the basal tubular part 2 mm. long, the campanulate upper portion 4–5 mm. long, minutely pilose at throat, not scaly; anthers subsessile at constriction, thick, filling the cavity, dehiscence by longitudinal chinks on upper two-thirds of the cells (Cuatrecasas).—Bentham and Hooker, Gen. Pl. 2: 904. 1883, not finding the perigynous ring described and illustrated by Miers referred the latter's genus to *Juanulloa* R. & P.; Dammer observed minute pubescent

scales; Cuatrecasas noted that the only very distinctive character of *M. Ulei* (probably of *E. Pavonii*) is the subsessile anthers and it is scarcely a generic one! The four collections of Klug have yellow-green flowers; his *126*, calyx 5 mm. long, deeply cleft, the lobes reflexed, corolla 12 mm. long, may be distinct; *E. Pavonii* (type from Guayaquil) ex char. has 5 equal triangular erect calyx teeth, anthers dehiscing to base, subsessile on inner side of a free ciliate ring; these apparent characters will probably prove to be manifestations of a variable androecium. But since Cuatrecasas did not choose to transfer *E. Pavonii* as the earliest name this may best be done by the student able to study it from the type region or adjacent Peru where it may be recollected.

Loreto: Boquerón Padre Abad, *Woytkowski 34387* (det. Cuatrecasas). Mishuyacu from Iquitos, *Klug 5; 126; 1127*. Balsapuerto, *Klug 2953*. Cerro de Ponasa, *Ule 32* in part (Herb. Dahlem), but pedicels 1 dm. long, calyces and bright yellow-green corollas 6 cm. long and broad. Amazonian Brazil; Ecuador?

17. JUANULLOA R. & P.

Ulloa Pers. Syn. 1: 218. 1805.

Reference: Cuatrecasas, Brittonia 10: 146–150. 1958.

Shrubs, often epiphytic or sarmentose with entire more or less coriaceous leaves and tubular-funnelform red or yellow flowers little or much exserted from a more or less deeply divided but inflated, usually colored calyx. Pedicels stout or incrassate toward apex. Corolla usually contracted at the dentate apex. Filaments filiform, elongate, anthers linear, dehiscence longitudinal. Ovary usually conical, annular disk lobulate, fleshy. Fruit enclosed in calyx.—Differs chiefly from *Markea* by the shape of the corolla, this rarely not contracted but not campanulate apically.

Few of the Andean species have been available; the following account of those accredited to Peru is therefore entirely from literature. Named for Jorg Juan and Antonio de Ulloa, companions of La Condamine, Jussieu and others who were in Peru when on the expedition to measure a degree of the equator; this for the determination of the shape of the earth!

Two obscure or imperfectly known species are retained, as described, in *Salpichroa* where they can scarcely belong, but quite possibly they are equally aberrant here.

KEY TO JUANULLOA

Flowers small, scarcely 1 cm. long (cf. *J. microphylla*).

Racemes a few cm. long.....*S. breviflora.*

Corymbs open, 5–7-flowered.....*S. cuspidata.*

Flowers large (unknown, *J. microphylla*).

Calyx early inflated and deeply cleft laterally, shortly dentate, finally 4–5-parted; leaves glabrous or early pulverulent at least beneath.

Calyx membranous.

Leaves 8–12 mm. wide; corolla probably small, narrow. *J. microphylla.*

Leaves much larger; corolla to 6 cm. long, ampliate limb 1.5 cm. wide.....*J. grandiflora.*

Calyx fleshy-coriaceous; corolla to 4.5 cm. long, narrow. *J. parasitica.*

Calyx equally or subequally parted, not or little inflated in bud, segments 1.5–2 cm. long.

Calyx submembranous; leaves glabrous.....*J. ochracea.*

Calyx coriaceous; leaves tomentose beneath.....*J. ferruginea.*

Salpichroa breviflora Dunal in DC. Prodr. 13, pt. 1: 474. 1852.

Glabrous including the flower segments but the rigid branches more or less lineately glandular, the glands variously developed; leaves obliquely rhombic-subovate-lanceolate, unequally rounded to the short petiole, this globosely glandular at apex, acutely acuminate, 2.5–7.5 cm. long, nearly 1–1.5 cm. wide, coriaceous, opaque, paler beneath, with 4–5 pairs of obscure very slender long-branched nerves; racemes straight, to 2.5 cm. long, peduncles obsolete, to 7 mm. long, pedicels 5–7, stout, scarcely 0.3 mm. long; calyx crateriform, deeply parted, the 5 unequal acute segments to 2 mm. long and wide; buds cylindric-conic, obtuse, about 5 mm. long, 4 mm. thick; corolla fleshy, subcampanulate, tube 4.5 mm. long, 3 mm. thick, the 5-parted limb 3–5 mm. across, with ovate-lanceolate recurved acute unequal lobes nearly 2 mm. long, the subinflexed margins puberulent; stamens little longer than tube, the filaments 2– nearly 3 mm. long, anthers yellowish, stout, ovoid, sulcate, 1 mm. long; ovary obconic, sulcate, annulate at base; style shorter than filaments; stigma discoid, glandular.—This ex char. doubtfully a *Salpichroa;* more probably a *Juanulloa.* F.M. Neg. 6872.

Amazonas: Chachapoyas, (type, *Mathews?*, Herb. DC.).

Salpichroa cuspidata Dunal in DC. Prodr. 13, pt. 1: 474. 1852.

Glabrous or essentially, but branches and branchlets somewhat marked by oval or oblong glands; leaves shortly petioled, elliptic cuspidate, about 1.5 dm. long, half as wide, coriaceous, paler beneath, the 6–8 slender nerves there prominent, anastomosing; corymb terminal, 2–3-forked, lax, long-peduncled; pedicels 4–10 mm. long, glandular, with linear-subulate bracts 4–10 mm. long; calyx coriaceous, cyathiform-poculiform, the 5 triangular acute segments 5 mm. long, 7 mm. wide, reddish in herb.; buds infundibuliform, angled, limb segments oval-lanceolate, obtuse; stamens included; filaments in tube, pilosulous, to 0.5 mm. long; anthers oblong-linear, obtuse, reddish, about 3 mm. long, longitudinally dehiscent; ovary disk prominent; style filiform, 6 mm. long, stigma cupuliform; calyx little enlarged about the subglobose berry, this 8–10 mm. in diameter.—This, as *S. breviflora* Dunal, doubtfully in this group and possibly, especially this shrub, not in Peru. F.M. Neg. 34134.

Peru(?): (*Atropa? 456*, Pavón, in Herb. Boissier).

Juanulloa ferruginea Cuatr. in Brittonia 10: 149. 1958.

Unique in the dense reddish-brown tomentum on petioles (1–2 cm. long), leaves (in some degree beneath), these 13–18 cm. long, 5–7.5 cm. wide, pedicels (1–1.5 cm. long), calyces (1.5–2 cm. long) and short tubular corollas, these about 2.6 cm. long, not basally constricted, ampliate, with reflexed lobes 7–8 mm. long; stamens free at middle of tube, this exceeded by the 4 mm. long anthers, their clefts about 2.5 mm. long.—Type from Puerto Espino, Río Putumayo, near Ecuador and Peru. There are several similar plants proposed as distinct species and the Peruvian one with calyx glabrate (in age), shorter corolla lobes, grayish tomentum, may be yet another entity; *J. speciosa* (Miers) Dunal of Colombia may be represented by *Soukup 2920* from the Botanic Garden, Lima; its leaves are rusty tomentose beneath, calyx 3–3.5 cm. long.

San Martín: San Roque, *Williams 7081; 7641* (ex char.). Adjacent Colombia.

Juanulloa grandiflora Dunal in DC. Prodr. 13, pt. 1: 531. 1852.

Branches straight, subterete, glandular puberulent, tomentulose toward the foliose tips; petioles canaliculate, rounded dorsally, about

1–2 cm. long; leaves approximately paired, oval-lanceolate, attenuate into petiole, subacute, to about 1.5 dm. long, 5 cm. wide, thin-membranous, glabrate above, puberulent beneath in the 7–9 primary nerves and reticulate veins; peduncles subaxillary, scarcely 2 cm. long, incrassate above, 1 (–few) -flowered, puberulent-tomentulose; calyx 3 cm. long, ovoid, inflated, pilosulous, 4–5-parted, segments acute, unequal, one deeply divided; corolla subglabrous, 5–6 cm. long, limb subinfundibuliform, 1.5 cm. across, the broadly ovate, acute undulate lobes medially gray tomentulose without; ovary conical, style filiform, as long as corolla tube; stamens nearly attaining corolla-throat.—After author, the type under name of Pavón in Herb. Boissier. F.M. Neg. 8570.

Huánuco(?): *Ruiz & Pavón*, type.

Juanulloa microphylla Dunal in DC. Prodr. 13, pt. 1: 531. 1852.

Branches glabrous, scarred by the fallen leaves, subangulate, geniculate-nodose, the short foliose branches puberulent; petioles 6–8 mm. long, pilosulous; leaves geminate, ovate or elliptic or subobovate, obtuse or acute, mucronate, to 2 or 2.5 cm. long, 8–12 mm. wide, green and obscurely puberulent above, paler and glabrate beneath, subrounded or slightly decurrent at base, primary nerves 2–3 pairs; peduncle terminal and axillary, 1-flowered, glabrous, incrassate above, 10–12 mm. long; calyx 1–2 cm. long, membranous, lustrous, glabrous, inflated-cylindric, 7 mm. in diameter, the teeth triangular-oblong, acutely acuminate; ovary ovoid, style straight, terete, enlarged at base, equaling calyx, stigma thick, 1 mm. across, suborbicular.—After author, otherwise unknown; in habit and foliage it suggests *Salpichroa;* it may, when flowers are discovered, be found to be *Iochroma.* F.M. Neg. 8569.

Junín: Huasahuasi, *Ruiz & Pavón*, type (Herb. Boissier, Geneva).

Juanulloa ochracea Cuatr. in Brittonia 10: 148. 1958.

Shrubby, the pendent branchlets, the petioles (5–14 mm. long) and the 3–4 subumbellate axillary flowers including the yellow-ochraceous corollas without more or less pulverulent; leaves ovate-oblong or oblong-sublanceolate, rounded obtuse or cuneate at base, acutely acuminate, 8–20 cm. long, 4–7 cm. wide, glabrous, papyraceous but somewhat rigid, secondary nerves (about 6) obscure above, subprominent beneath, veins faint; bractlets 1.5–2 mm. long; ped-

icels 5–15 mm. long; calyx firm-membranous, sub-basally parted, the 5 oblong-lanceolate acute segments 15–22 mm. long, 2–5 mm. wide at base; corolla barbate within only at stamen insertion, about 1 cm. above base, 3.5 cm. long, the tube 8 mm. long, 5 mm. thick, the limb about 8 mm. across, little constricted apically, the oval obtuse lobes reflexed, 2 mm. long; filaments 12–15 mm. long, anthers 8 mm. long, subcordate; disk undulate, 1 mm. high; style lobed, ampliate; fruit ovoid, 12 mm. broad.—Resembles *Markea* Rich. (1792) but corolla narrowly tubular, slightly broadening medially, constricted below apex; *Juanulloa parviflora* (Ducke) Cuatr., l.c. 150, has corolla not constricted nor enlarged at apex; with discovery of more intermediate species of *Juanulloa* R. & P. (1794), some botanist may admit that the generic definitions are arbitrary, a seemingly obvious probability even now.

Loreto: Florida, Río Putumayo, *Klug 2360*. Colombia.

Juanulloa parasitica R. & P. Fl. Peruv. 2: 47, *pl. 185*. 1799; 528. *Ulloa parasitica* Pers. Syn. 1: 218. 1805.

Suffrutescent glabrous epiphyte with many often dependent stems, little or not branched, the younger angulate, purplish; petioles 1.5–3 cm. long, often curved at base; leaves alternate or subgeminate, oblong-elliptic or somewhat obovate or lanceolate, entire or subrepand, attenuate at base, cuspidate, mostly 1–1.5 dm. long, 5–7 cm. wide, lustrous (drying opaque), coriaceous, punctulate, paler beneath, the 5–8 primary nerves not prominent; racemes sometimes dichotomous, at least early terminal, more or less pendent, to 1.5 dm. long, purplish peduncles and pedicels terete, the latter 6–12 mm. long; calyx orange, fleshy, ovoid, inflated, early 2, finally 4 cm. long, 2 cm. broad, the unequal linear-oblong segments acutely acuminate, in age divided; corolla below throat inflated-ventricose, 8 mm. in diameter, a little contracted at throat, 6 mm. wide at base, the limb 1 mm. long, the rounded or subacuminate lobes scarcely 4 mm. long; filaments densely pilose basally, 8–10 mm. long, anthers equal, 8 mm. long; ovoid-globose ovary in torulose disk; fruit 2.5 cm. long, nearly 2 cm. thick, puniceous, the violet seeds in a lustrous pulp.—Ovoid-inflated corolla 3 cm. long as illustrated by Miers, Ill. S. Amer. Pl.

San Martín: Tarapoto, *Ule 6606*. Jepelacio, *Klug 3529* (det. Standley, *J. grandiflora*).—Huánuco: Huamalies, *Weberbauer 3437*. Pozuzo and San Antonio, *Ruiz & Pavón*, type.—Loreto: Puente Melendez, *Tessmann 4876* (det. Werdermann). Bolivia; Mexico?

18. CESTRUM L.

Sessea R. & P. Prodr. 21, *pl. 33*. 1794.

Reference: P. Francey, Candollea 6: 46–398. 1936 (not 1935; cf. 7, title page); 7: 1–132. 1936.

Shrubs or trees, often with virgate flowering branches, and usually greenish-yellow flowers in terminal or axillary cymes, panicles or racemes, stipuliform leaves often deciduous, probably sometimes caducous. Calyx campanulate, tubular or poculiform. Corolla salverform or tubular-funnelform, the tube very long and slender, more or less contorted at throat. Stamens usually equal or subequal (except *C. conglomeratum, C. confertum, C. foliosum*), 5, adnate to the corolla tube, the filiform filaments often pubescent especially below, sometimes tumid or with a toothlike appendage. Anthers (Peru) spherical or ellipsoid. Ovary glabrous (or papillose, rarely glabrate), oblong or globose, or shortly stiped, 2-celled, style filiform, stigma entire or lobed, rarely exserted. Fruit capsular to baccate, scarcely or little succulent.—Embryo straight or nearly. Floral parts 4, sometimes 4, 6 or 7. Many species are reputed to have medicinal value and most emit a very disagreeable or even foetid odor, although the flowers may be fragrant.

Sessea, as section and genus, recalls Don Martín Sessé, director of the Botanical Garden of Mexico at the time of Ruiz and Pavón. Dunal (followed by Francey) divided the genus into two sections: *Habrothamnus* (Endl.) Schlecht. flowers somewhat purple to orange or red, the calyx narrow, often reflexing segments, the Mexican and Central American species *C. elegans* (Brongn.) Schlecht. and *C. aurantiacum* Lindl., both cultivated, at least in the botanical garden at Lima in 1946 (*Soukup 2921, 2928*), the former with tomentose leaves, purple flowers 2 cm. long, the latter with glabrous leaves, orange flower 2.5 cm. long; *Eucestrum* Dunal, flowers whitish, greenish, yellowish, calyx with broad short erect teeth.

The key includes Peruvian plants described as Sesseas but several have not been transferred, since their standing may be questioned; in the description of generic characters not diverse to typical, as glabrous ovary, rotund anthers, etc., these plants have not been included, and for convenience the stipuliform leaves sometimes developed are referred to as stipules in the key. This has been transcribed from Francey's meticulous work but modified in conformity to the floristic approach of this publication; the well-drawn descriptions are essentially his or his interpretation of Dunal's. In Notizbl. Bot. Gart.

Berlin 11: 978, 1934, he gave a key largely copied herewith as pertaining to Peru based primarily on that of Bitter, l.c., but he noted that it was not possible for him to place all species in the grouping of the previous student.

Francey, l.c. 49–51, discussed the character of *Sessea* in contrast to that of *Cestrum;* while he retained the former his remarks indicate that he did so with considerable doubt; then, too, as a student he may have been diffident or was counseled to respect tradition. The conclusion that *Sessea* constitutes a natural group would be reinforced if the family as a whole did not exhibit within well-defined groups various fruit anomalies that are accepted as merely specific; even the not closely allied *Lycium* furnishes examples, as do *Datura, Solanum* and *Brunfelsia.* Accordingly, in conformity with the general intent followed in this work, the species of *Sessea* with 2-valved capsules, the valves sometimes so deeply bifid as to appear 4 (*S. pedicellata* is actually 4-valved according to Francey) are treated as species of *Cestrum.* Francey found that the ovary in dissection was not easily or as easily parted in *Cestrum* but the distinction is one of degree and, significantly, not concomitant with characters of pubescence or fruit, the latter, as agreed by Francey, sometimes passing in design from capsular to baccate, notably, in Peru, in the case of *C. glaucophyllum* and probably other species when fruit is known. Some species, as in true *Cestrum,* may prove to be individual variants.

KEY TO CESTRUM (including SESSEA)

Indument obvious all over leaves beneath and in inflorescence including calyces (or these tardily glabrate; glabrous only, *C. flexuosum*) and (or) corollas; inflorescence or the flowers at tip of often bracteate or foliose branchlets, these always longer than the subtending petiole.

Corolla pubescent including the tube; fruit capsular except *C. strigillatum.*

Calyx subtruncate-crenate; ovary apically pilose.

Calyx 7–9 mm. long ..... *C. Mancoi.*

Calyx 5–5.5 mm. long (species may be one and variable; see also *S. multiflora*).

Corolla (type) at least 2 cm. long; pedicels in part 1–1.5 mm. long ..... *C. Franceyi.*

Corolla (type) at most 18 mm. long; pedicels none to 0.5 mm. long ..... *S. discolor.*

Calyx 3–3.5 mm. long..... *C. osnoense.*

Calyx dentate, 7–10 mm. long.

Corolla about 1.5 cm. long; fruit capsular.

Flowers many in broad panicles; ovary pilose at tip. *C. maleolens.*

Flowers few, inflorescence simple or panicles narrow; ovary glabrous..... *C. dependens.*

Corolla about 3 cm. long; fruit baccate. *C. cancellatum, C. strigillatum.*

Corolla glabrous or the lobes obscurely pulverulent; fruit baccate or tardily dehiscing at apex.

Indument sparse or fine, stellulate.

Flowers 3.5 cm. long, 1–3; filaments glabrous, 1.5 mm. free. *C. glaucophyllum.*

Flowers about 17 mm. long, several to many; filaments pilose, 5 mm. free.

Calyx glabrous..... *C. flexuosum.*

Calyx lanate..... *C. Humboldtii.*

Indument dense, villous-stellate; filaments glabrous, 5.5–7 mm. free.

Corolla lobes obtuse; calyx teeth broadly ovate, acute; leaves subcordate..... *C. lanuginosum.*

Corolla lobes acute; calyx teeth 1–1.5 mm. long, 1 mm. wide, acuminate; leaves subacute at base..... *C. tomentosum.*

Indument lacking in age or an obscure puberulence on calyces, corollas and rarely leaves beneath especially on nerves, then often deciduous.

Inflorescence rarely sessile, always longer than subtending petiole, sometimes at branchlet tip.

Leaves somewhat pubescent beneath; filaments pilose (except *C. glaucophyllum*), free 5.5–7 mm.

Lateral leaf nerves 20 or more pairs.. (*C. venosum*) *C. petiolare.*

Lateral leaf nerves 13 or 14 pairs..... *C. Humboldtii.*

Lateral leaf nerves 5–9 pairs.

Calyx 5 mm. long; spikes 5–7-flowered..... *C. flexuosum.*

Calyx 10 mm. long or longer; spikes 1–3-flowered. *C. glaucophyllum.*

Leaves glabrous, or soon obscurely pulverulent.

Calyx 6–10 mm. long; filaments somewhat pilose, denticulate (*C. aberrans*), free 4–6 mm. or longer except *C. longiflorum* (2 mm.).

Leaves 2–7 cm. long; flowers to 2 cm. long.

Corolla 22 mm. long, glabrous; fruit baccate. . *C. Dunalii.*

Corolla 1.5 cm. long, calyx puberulent; fruit capsular. *C. aberrans.*

Leaves often 1–2 dm. long; flowers 5–6 cm. long. *C. longiflorum.*

Calyx 2–4.5 (5) mm. long; filaments glabrous except *C. ovatolanceolatum.*

Filaments denticulate or bent, 3.5 mm. free; calyx nearly tubular, 3.5–5 mm. long; corolla 2.5–3 cm. long (species may be tenuous).

Leaves crisped-undulate; stipules deciduous; filaments denticulate. . . . . *C. undulatum.*

Leaves plane or nearly; stipules none.

Filaments denticulate; leaves (type) abruptly cuspidate. . . . . *C. ovalifolium.*

Filaments merely geniculate; leaves acuminate.

Corolla about 2.5 cm. long; calyx 4 mm. long. *C. Raimondianum.*

Corolla about 3 cm. long; calyx 5 mm. long. *C. pseudopedicellatum.*

Filaments smooth, even, free 0.5–3 mm.; calyx obconic-campanulate, 2–3.5 mm. long.

Stipules none; calyx 2 mm. long, subpulverulent; corolla about 1 cm. long. . . . . *C. ovatolanceolatum.*

Stipules present unless in age; corolla about 2.5 cm. long.

Leaves often 8–15 cm. long, principal nerves 7–8 pairs. *C. reflexum.*

Leaves often 5–7 cm. long, principal nerves 10–12 pairs. *C. auriculatum.*

Inflorescence rachis more or less developed or (and) the leaves oblong-lanceolate or in part about 1 dm. long and often elliptic; filaments various; see contrast 3.

Leaf nerves many (often 13–21 pairs), subparallel nearly to margin; filaments uneven, 1–5 mm. free.

Stipules none; leaves rounded at base; adnate part of filaments pilose.....*C. racemosum.*

Stipules present; leaves acute to base; filaments glabrous.
C. Mathewsii.

Leaf nerves 7–15, arcuate, uneven, often joined well before margin.

Stipules conspicuous; leaves rarely 4 cm. wide, oblong-ovate-lanceolate except *C. Weberbaueri;* filaments glabrous.

Leaves often 1 dm. long, acute at base; filaments dentate (known).

Leaves to 2 cm. wide; stipules lunate.....*C. Macbridei.*

Leaves to 4 cm. wide; stipules suboblong.

Calyx to 5 mm. long; stipules 3–5 mm. long.
C. peruvianum.

Calyx 6–6.5 mm. long; stipules 1–1.5 cm. long.
C. Weberbaueri.

Leaves 5–10 cm. long, rounded basally or to a subacute base; filaments smooth.....*C. foliosum.*

Stipules deciduous, minute or lacking; leaves all or many 5 cm. wide or wider except *C. laevifolium;* filaments pilose to puberulent.

Leaves truly ovate or ovate-lanceolate, mostly 5 cm. wide below middle; corolla 1 cm. long, filaments free 0.5 mm. (type).....*C. ovatolanceolatum.*

Leaves oblong-lanceolate, few 5 cm. wide, lustrous; corolla 2 cm. long, filaments free 4 mm.....*C. laevifolium.*

Leaves more or less elliptic-lanceolate, many 5–10 cm. wide, subopaque; corolla 1.5–2 cm. long.

Leaves not decurrent; calyx 4.5 mm. long, clearly costate; filaments barbate, free 1.5–3.5 mm.....*C. loretense.*

Leaves decurrent; calyx 2.5–3 mm. long, subterete or 5-nerved; filaments, except *C. obscurum,* free to 4 mm., pilose (species, except *C. obscurum,* seem intangible).

Corolla gradually ampliate, finally 16–20 mm. long; calyx glabrate.

Calyx subcyathiform; leaves membranous.
C. nemanthum, C. silvaticum.

Calyx tubular; leaves firm to coriaceous. *C. Baenitzii.*

Corolla cylindric nearly to apex, 15 mm. long; calyx tubular, glabrous in type..... *C. obscurum.*

Inflorescence much reduced, rachis none or obscure, the flowers (or flower) sessile or subsessile in the axils; leaves to 1 dm. long or longer, always rather elliptic, but often rigid; filaments even, except *C. Sendtnerianum* (cf. *C. Mathewsii*).

Flowers 1–4; filaments denticulate, pilose.... *C. Sendtnerianum.*

Flowers usually many; filaments even.

Leaves very rigid, to 7 cm. long, nerves 4–8 pairs. *C. confertum.*

Leaves more or less flexible, 1–2 dm. long, and (or) many-nerved.

Stipules none; corolla 15–17 mm. long... *C. conglomeratum.*

Stipules present; corolla (14) 19–21.5 mm. long.

Leaf nerves 18–21, rigid; leaves 2.5–3.5 cm. wide, coriaceous..... *C. Mathewsii.*

Leaf nerves 12–14, rigid, coarse; leaves 4–7.5 cm. wide, coriaceous..... *C. ellipticum.*

Leaf nerves 10–12, slender; leaves 2.5–4 cm. wide, membranous..... *C. falcatum.*

Cestrum aberrans Macbr., nom. nov. *Sessea confertiflora* Francey, Notizbl. Bot. Gart. Berlin 11: 880. 1934, not Schlechtendahl.

Branches 2.5–4 mm. thick, glabrous as the shortly fastigiate branchlets except early puberulent apically; petioles 1–6 mm. long, 1–2 mm. wide, enlarged at base; leaves erect or nearly, oblong-lanceolate, cuneately long-decurrent at base, obtuse or obtusely acute, 4.5–7.5 cm. long, 1.5–3 cm. wide, subcoriaceous, revolute, lustrous above, glabrous, irregularly disposed lateral nerves about 7; axils fuscous tomentose; flowers capitately congested, pedicels 1 mm. long, peduncles 1–5 (–8) mm. long, puberulent as the obconic calyx, this 7.5–10 mm. long, 3 mm. across, broad obtuse unequal teeth 1–1.5 mm. long; corolla glabrous except lobes, whitish-green, 1.5 cm. long, tube 11 mm. long, limb lobes puberulent, orbicular, 2.5 mm. long; filaments adnate, 4 mm. long where pilose, the teeth bifid; ovary glabrous, 6-ovuled; stigma capitate; capsule obovoid, included, 6.5 mm. long, 3.5 mm. thick, shortly stiped, dehiscing

by narrowly elliptic valves, the 3–4 mature seeds 3 mm. long, 1 mm. wide, cotyledons elliptic.—According to Raimondi poisonous to all domestic animals.

Ancash: Between Huara and Llipe, Prov. Cajatambo, (*Raimondi*, type).—Lima: San Juan to Huarochiri, (*Raimondi*). "Laplacata."

Cestrum auriculatum L'Hèr. Stirp. 1: 71, *pl. 35.* 1788; 132. *C. lasianthum* Dunal in DC. Prodr. 13, pt. 1: 649. 1852. *C. serratum* Dunal, l.c. 665. *C. leptanthum* Dunal, l.c. 666, all fide Francey.

A slender-branched shrub 1–several meters high, glabrous except for the often finely puberulent inflorescence branches and flowers; petioles 1–1.5 cm. long, often biauriculate at base, the auricles lunate and as long as or much shorter than the petioles; leaves oblong-ovate or -lanceolate, to 1 dm. long or longer, often shorter, more or less acuminate, somewhat narrowed at base; flowers in terminal and axillary corymbose panicles, sessile or scarcely pedicellate, to about 2.5 cm. long, yellowish-green with blackish or reddish-brown overtones; calyx glabrous to pubescent, nearly cyathiform, scarcely 2 mm. long, the teeth minute; corolla tube filiform, enlarged above, often lightly puberulent, filaments free 1.5–3 mm., glabrous except adnate part, edentate; fruit fleshy, black.—The plant described here is that illustrated by L'Hèritier, and Dunal may have erred in referring to it the earlier published *C. hediunda* Lam. which more probably is his *C. hediundinum*, the corolla glabrous. It is not clear, however, that more than one variable species is concerned, as Francey decided, but he did not use Lamarck's name. *Dombey 352* and *Gaudichaud 87*, both Herb. DeCandolle and without data except "Peru," are types of Dunal's species. Only some of the many collections are listed. F.M. Negs. 2970, 2980 (*C. hediundinum*); 6902 (*C. lasianthum*); 6985 (*C. leptanthum*); 8572 (*C. serratum*).

Cajamarca: Chota, *Raimondi*. Cascas, *Raimondi*.—San Martín: Tarapoto, *Woyktowski 35026* (det. Cuatrecasas); *Williams 6169*.—Ancash: Tambo de Pariocota, *2545*. Chancos, *Nuñez 3241*.—Lima: *Dombey*, type. Lurín, *Pennell 12221*. Stn. Eulalia, *Goodspeed 33102* (det. Killip). Canta, *Pennell 14355; Nuñez 950; 954*. Prov. Canete, *Vargas 9313* (det. Johnston). Río Chillón, *Pennell 14445*. Atocongo, *Mexia 04037* (det. Johnston). Callao, *Gaudichaud*. Chosica to Matucana, *76; 539; Mexia 04092* (det. Johnston); *Soukup 2055; 2069*.—Huánuco: Pampayacu, *Sawada 47*.—Arequipa: Laspinas, 2,200 meters, *Eyerdam & Beetle 22149* (det. Johnston). Tiabaya,

Pennell 13089. Near Arequipa, *Rose; Isern.* Guicacha, *Ferreyra 7220.*—Puno: Near Puno, *Soukup 406* (distr. as *C. conglomeratum*). Ecuador. "Hierba Sancta," "hierba hedionda."

Cestrum Baenitzii Lingelsh. Repert. Nov. Sp. 7: 248. 1909; 309.

Branches erect, 6–8 mm. thick, the erect rigid branchlets longitudinally striate-canaliculate, sometimes pulverulent toward the apex; stipuliform leaves none; petioles stout, sometimes tortuous, arcuate, 7–15 (20) mm. long; leaves approximate apically, at maturity oblong-elliptic or subovate, long-attenuate into the petiole, gradually narrowed to the acute, obtuse or rounded and shortly cuspidate apex, mostly 1–3 dm. long, 6–10 cm. wide, sometimes even larger, chartaceous or firmer, often coriaceous, obviously revolute at least toward apex, lustrous especially above, the midnerve and 7–10 lateral nerves prominent beneath, the reticulation lax; racemes subspicate, 7–10-flowered, often 3 or 4 in axil, the rachis 3–20 mm. long, puberulent as the 1 mm. or shorter peduncle; floral leaves none; flowers yellowish or pale green, usually subsessile; calyx tubular, terete, 2.5–3 mm. long, 1.5 mm. thick, glabrate or minutely puberulent only without, the 5 teeth strongly unequal, 0.5–1 mm. long, 1 mm. wide, often connate; corolla infundibuliform, finally 16.5–18 mm. long; lobes 3–4.5 mm. long, glabrous within; filaments adnate two-thirds the length of tube, free 3.5 mm., smooth, pilose to above the middle; style 11.5–14 mm. long, pubescent toward tip; stigma capitate-discoid; fruit obovoid or subglobose, shortly attenuate at base, 8.5 mm. long, 6 mm. thick, black, violet or green; seeds 3, 5 mm. long, 3 mm. broad, 2 mm. thick, rounded dorsally, angled or plane on the inner face.—Perhaps only varietally distinct from *C. megalophyllum* Dunal in DC. Prodr. 13, pt. 1: 638. 1852 (Morton, Journ. Arnold Arb. 17: 341. 1936); however, the typical form of Dunal's plant from Trinidad often has shorter dentate petioles, shorter flowers, equal calyx teeth, characters that may be inconstant or inconsequential. Illustrated, Francey, *pl. 3, fig. 50* (flower).

San Martín: Tarapoto, *Spruce 4355.* Jepelacio, *Klug 3612* (det. Standley). San Roque, *Williams 6970; 7617.* Pongo de Cainarachi, *Klug 2625.*—Huánuco: Exito to Balsaplaya, *Vargas 5355.* Puente Durand to Exito, *Mexia 8155* (det. Morton, *C. racemosum*). Tingo María, *Allard 21944* (det. Lyman Smith).—Loreto: Yurimaguas, *Poeppig 2315; Killip & Smith 28051; 28534; 29034; 29051; Williams 5277; Ferreyra 7839.* Río Mazán, *Mexia 6463* (det. Standley).

Pongo de Manseriche, *Tessmann 4209*. Iquitos, *Ule 6240; Killip & Smith 27453; Klug 1083*. Río Nanay, *Williams 627* (det. Werdermann). Bolivia and Brazil to Central America. "Yanagara negra" (Mexia).

Cestrum cancellatum Dunal in DC. Prodr. 13, pt. 1: 657. 1852; 136.

Branches compressed above, sulcate-canaliculate, 3–4 mm. thick, apically leprose-tomentose; petioles 5 or 6 mm. long, 1–1.5 mm. thick, enlarged at base, stellate-tomentose as the inflorescence and younger leaves beneath, these ovate- or elliptic-lanceolate or oblong, long-attenuate or cuneate to base, in type acuminate to a very narrow acute tip, usually 1–2 dm. long, about 4–6 cm. wide, membranous, scarcely revolute, greenish-olive, glabrous and lustrous above, the slender lateral nerves 7–8, prominent and reticulate beneath; stipule-like leaves none; spikes axillary, 4.5–7 cm. long, stellate-tomentose; flowers sessile, rather fasciculate, the subpetiolate bractlets ovate-acuminate or cuspidate, 8–12 mm. long, 4 or 5 mm. wide; calyx lax, cyathiform, angled, 7–9 mm. long, 4 or 5 mm. thick, puberulent within, 5-nerved, the acute or acuminate teeth 2.5 mm. long, 2 mm. wide; corolla 3–3.5 cm. long, tube contracted above and below ovary, cylindric, subfiliform, dilated at throat, infundibuliform-clavate, about 27 mm. long, not constricted below the limb, yellowish, stellate-pilose and within pubescent, the ovate acuminate segments 7–8.5 mm. long, 2 mm. wide, marginally introflexed, densely tomentose without, puberulent within; stamens equal, filaments adnate to tube, 1–2 mm. free, glabrous, smooth, straight; ovary 16-ovuled; style 28 mm. long, slightly tomentulose only above, stigma capitate, bifid; berry sessile, ellipsoid, at least 6 mm. long with 10 seeds.—The type by Poeppig fide Dunal from Río Plata is doubtfully separable from *C. strigillatum* R. & P. var. *calycinum* (Willd.) Ktze. to which Francey in herb. referred *Williams 6570* from Tarapoto; in monograph he referred the specimen to *C. cancellatum*, at least as to Peru; *C. cancellatum*, then, seems at most a variant. F.M. Neg. 2969.

Peru (cf. note above). Brazil?

Cestrum confertum R. & P. Fl. Peruv. 2: 29, *pl. 153*. 1799; 221.

Glabrous except for some long evanescent lanosity at the growing tips, this indument reddish and enduring in the leaf axils; branches many, elongating, virgate, 3–5 mm. thick, becoming sulcate, the few branchlets 1–1.5 dm. long; leaves spreading, broadly elliptic

or obovate, acute or rounded at base, shortly acuminate or rounded and shortly cuspidate, 3.5–6 cm. long, about 2–4 cm. wide or somewhat larger, coriaceous, rigid, revolute, nitidulous both sides, paler beneath, the midnerve and 4–6 (–8) lateral nerves there yellowish and very prominent; stipuliform leaves none; flowers sessile, 6–7 congested in the leaf axils and as many as 20 crowded apically; bracts linear, acuminate, 2 mm. long; calyx coriaceous, obconic, cyathiform, 3–4 mm. long, 2 mm. across, glabrous within but merely glandular without and the 5 broad teeth subacute or obtuse, marginally tomentulose, 0.5 mm. long; corolla infundibuliform, green or slightly brown-violet, 18.5 mm. long, the tube contracted below the ovary, scarcely ampliate to apex or constricted below the limb, 15.5 mm. long, glabrous without, pulverulent within, the lobes (of the limb) 3–4.5 mm. long, broadly ovate or suborbicular (explanate), glabrous except for the puberulent margins; stamens unequal, 14–15 mm. long, the filaments free for 2 mm., smooth, arcuate, not geniculate nor tumid, the adnate portion puberulent; anthers subquadrate; ovary attenuate at base, glabrate; style 1.5 cm. long, filiform, sparsely puberulent to base, stigma capitate; fruit ovoid-ellipsoid, fulvous, 4–5 mm. long, 2.5–3.5 mm. thick, subtended by the accrescent calyx; seeds brown, oblong, triangular, 3 mm. long, 1.5 mm. broad, 0.7 mm. thick.—Var. *grandifolium* Francey, l.c. 22, seems to be only a particular name given to an individual with leaves to nearly 1 dm. long, lateral nerves 7–8, the greenish-yellow flowers noted by the collector as fragrant. The leaves are extremely rigid, and at each petiole base there is a little cushion of reddish trichomes (Francey). F.M. Neg. 18392.

Huánuco: Panao, Chaglla and Muña, (*Ruiz & Pavón*, type); *3961*. Huacachi, *4184*. Chaglla to Muña, 2,400 meters, *Weberbauer 6796*. In sunny thicket, 2,100 meters, Muña, *4058* (type, var.).—Junín: Carpapata, Prov. Tarma, *Soukup 3466*.

Cestrum conglomeratum R. & P. Fl. Peruv. 2: 29, *pl. 156*. 1799; 227.

In general like *C. confertum* but the leaves (typically) 1–2 dm. long, 3.5–nearly 6.5 cm. wide, elliptic-lanceolate, acute at base, acuminate, subcoriaceous, the lateral nerves 9–11 and, as the reticulate venation, prominent beneath; petioles 12–23 mm. long, gibbous at base; stipuliform leaves none; flowers sessile, (5–) 15–30 glomerate (typically) in the leaf axils, bracts (typically) elliptic-lanceolate, acute, glabrous or puberulent, 5 mm. long, bractlets linear, 2–3 mm. long;

calyx tubular-poculiform, 3.5–5 mm. long, 2 mm. across, glabrous within as without except for the 5–7 acute teeth, these tomentose marginally and within, 1 mm. long and broad; corolla greenish-white, infundibuliform, 17 mm. long, tube contracted below the ovary, finally obconic, little ampliated to apex, not constricted below the limb, 13.5 mm. long, quite glabrous; lobes 5–7, 2–3 mm. long, acute, lightly puberulent and marginally tomentose only without; stamens 5–7, 10–12.5 mm. long, 1 or 2 shorter, the straight smooth glabrous filaments free for 2 (–5) mm.; ovary oblong or shortly ellipsoid, 8-ovulate, obconically stiped; style 12.5 mm. long, filiform, obscurely puberulent toward apex; stigma capitate.—Var. *Kunthii* Dunal, DC. Prodr. 13, pt. 1: 620. 1852 (*C. reticulatum* Willd. ex Roem. & Schult. Syst. 4: 808. 1819), apparently only an individual variation, has more oblong-elliptic leaves, to 13 cm. long, to nearly 4 cm. wide, membranous but rigid; flowers 1.5 cm. long, 6–7-glomerate; filaments free for 5 mm.; bracts 2–3 mm. long; var. **simulans** Macbr., var. nov., ramulis foliisque subtus pileis minusve puberulentis; foliis ad 1 dm. longis, 6 cm. latis, acutis vel breviter acuminatis; this suggests *C. falcatum* with longer corollas, narrower leaves, and *C. bolivianum* Francey, l.c. 230, with narrower leaves, flowers 6–7 congested on a peduncle, and *C. coriaceum* as to Herrera, Synop. Fl. Cuzco 366. 1941, not Miers. Floral divisions are sometimes 6 or 7. Illustrated, Francey, 7: *pl. 2, fig. 53* (flower); *pl. 3, fig. 28* (flower). F.M. Negs. 2971; 2973 (var.).

According to Herrera an infusion of the leaves added to the popular beverage "chicha" serves as an excellent soporific.

Cajamarca: Huanamarca and Cascas, *Bonpland* (type, var. *Kunthii*).—Huánuco: Panao, *Ruiz & Pavón*, type. Near Muña, *4159*. Yanano, *3714*. Vilcabamba, Río Chinchao, *5151*.—Junín: Dos de Mayo, Pichis Trail, *Killip & Smith 25860*.—Apurímac: Prov. Abancay, *Raimondi 11098*.—Cuzco: Calca, *Herrera 2084*. Urubamba Valley, *Herrera 1124*. Quispicanchis near Marcapata, *Metcalf 30731* (type, var. *simulans*).—Puno: Prov. Carabaya, *Raimondi*. Colombia.

Cestrum dependens (R. & P.) Macbr., comb. nov. *Sessea dependens* R. & P. Veg. Syst. 44. 1798; Fl. Peruv. 2: 9, *pl. 116*. 1799; 217. *S. Dombeyi* Dunal in DC. Prodr. 13, pt. 1: 596. 1852.

A slender tree to 10 meters high with spreading pendent branches, the younger (and the leaves beneath) very pulverulently floccose-tomentose; petioles 1–3.5 cm. long; leaves ovate- or oblong-lanceolate, acute or rounded at base, to 17 cm. long, 5.5 cm. wide, green above

and glabrate or somewhat pubescent with few-branched trichomes; inflorescence in type pendulous, to 3 dm. long, very narrow, simple or often shortly branched, the lower branches to 6.5 cm. long; calyx 7–9 (11) mm. long, somewhat unequally lobed, prominently 5-costate; corolla 2.5 cm. long, tube more or less contracted below and above ovary, broadly obconic, 14.5 mm. long, limb segments 5 mm. long, when expanded 4.5 mm. wide, margin glandular-tomentose, obscurely puberulent; stamens subequal, 14 mm. long, adnate 5.5 mm., free part little pilosulous basally; stigma capitate, exserted; ovary glabrous; capsules 13 mm. long, 4 mm. wide, the 4 valves 6 mm. long, 2.5 mm. wide.—(Apparently these data, after Francey, l.c. 879, from Raimondi and Bolivia specimens.) Bitter pointed out that the Dunal type by Dombey was part of the same Ruiz and Pavón collection, the apparent differences, as finer leaf nerves, fewer flowers, unimportant. F.M. Negs. 3003; 6883 (*S. Dombeyi*).

Huánuco: Distrito Churubamba, *Mexia 8210* (det. Morton with query, *S. stipulata*).—Junín: San José, Andamarca to Pangao, (*Raimondi*, det. Francey). Huasahuasi, *Dombey; Ruiz & Pavón*, type.—Cuzco: Marcapata, *Vargas 3709*. Bolivia. "Pichi-pichi" (Mexia).

Sessea discolor Francey, Notizbl. Bot. Gart. Berlin 11: 985. 1934.

Branches flexuose, costate, verruculose below, 1.5–3 mm. thick, puberulent only toward apex; petioles mostly 2–3 cm. long, subquadrate, often contorted basally; stipuliform leaves deciduous, rotund, 2–3.5 mm. long and wide, tomentulose beneath; leaves often pendent, elliptic-ovate-lanceolate, ordinarily broadest below the middle, rounded or subacute at base, not decurrent, shortly and acutely attenuate at apex, 5.5–9 cm. long, 2.5–4.5 cm. wide, membranous, undulate, plane, opaque and glabrous above except the puberulent midnerve, beneath whitish-tomentulose, the 10–13 lateral nerves obvious; corymbs terminal, dense, 18 cm. long, 13 cm. broad, the branches strongly dichotomous, tomentose, the peduncles 7–10 cm. long; flowers congested, pedicels 0.5 mm. long; calyx attenuate below, tubular, 5.5 mm. long, 2.2 mm. thick, only without minutely pilose as the 5 minute rounded teeth marginally; corolla yellow, 18 mm. long, tube contracted below ovary, scarcely ampliate apically, 3.2 mm. broad, densely stellulate-pilose, 14.5 mm. long; lobes 2.8 mm. long, acute, puberulent only without, the margins lanate; stamens unequal, about 14 mm. long, the filaments free for 7 mm., slightly geniculate, incrassate and pilose, smooth, the adnate part

obscurely puberulent; ovary densely pilose above, the stipe obconic; style 14.5 mm. long, glabrous as the capitate stigma.—Leaves more tomentose beneath than the similar *S. multiflora* Bitter; the several plants designated as species may prove to be variants of one or two; Balls' collection has flowers 2 cm. long or longer, but sessile or subsessile. This, if distinct from *S. multiflora*, requires in *Cestrum* a new name (not *C. discolor* Dunal).

Cuzco: Rocky brushy slopes below Colquipata, 3,200 meters, *Pennell 13782*, type. San Miguel, *Cook & Gilbert 1148*. Quebrada de Paucartambo, *Vargas 11183* (det. Standley); *Balls B6673; Herrera 2974*. Bolivia. "Asnaj-salli" (Herrera).

Cestrum Dunalii Francey, Candollea 6: 353. 1936.

Branches erect, 1–2 mm. thick, pulverulent to puberulent-tomentulose, notably foliose with oblong-ovate-lanceolate leaves only 2–3 cm. long or slightly longer, 6–15 mm. wide, decurrent, acute or acuminate, membranous, reticulate-venose both sides, the 4–6 lateral nerves strongly ascending, conspicuous beneath, where sparsely puberulent, the upper surface glabrous; petioles 3–5 mm. long, grooved above; stipuliform leaves none; panicles terminal, subcorymbose, often 11 cm. long, nearly as broad, the floral leaves petiolate, oblong-lanceolate, acuminate, puberulent, 3–9 mm. long; flowers thyrsoid, 3–5 mm. distant, pedicels 2–3 mm. long, glandular, verruculose; calyx tubular-cupuliform, lax, angled, stoutly 5-nerved, 9.5 mm. long, glabrous without, papillose within, the unequal teeth often connate, these 3–5, acute, sinus acuminate; corolla 22.5 mm. long, tube contracted below and above ovary, obconic, 4 mm. broad at apex, not constricted below the limb, 17.5 mm. long, glabrous without, pilose on the adnate filaments, these free for 7.5–8 mm., little tumid or geniculate, villous-pilose; lobes of limb 4 mm. long, acute, glabrous except margins; ovary globose, shortly stiped, 16-ovulate; style 17.5 mm. long, glabrous, scarcely exceeding stamens; stigma capitate.—The small leaves are distinctive in the group of species with pedicellate flowers and long calyces (author). F.M. Neg. 3251.

Amazonas: Near Chachapoyas, *Mathews 3251*, type; *Raimondi 923*.

Cestrum ellipticum Francey, Candollea 6: 216. 1936.

Resembles the allied *C. confertum* but lax and with cushions of lanate pubescence in the petiole axils; the much larger leaves

(these 1–2 dm. long, about 4–7.5 cm. wide) elliptic-ovate-lanceolate, long-acute or acuminate, lustrous both sides, with 12 or more lateral nerves; petioles to 1.5 cm. long; stipuliform leaves ovate-falcate, at least 1 cm. wide, 1.5–2 cm. long; bracts lanceolate, 3–5 mm. long; calyx tubular-urceolate, 3.5 mm. long, 1.5 mm. across, glabrous except for the marginally puberulent acute teeth; corolla 21.5 mm. long, the long cylindric tube ampliate-clavate toward apex, 17.5 mm. long, glabrous within as without; stamens 17 mm. long, often unequal, entirely glabrous.—This species is characterized by the regularly elliptic leaves, the nerves prominent beneath contrasting with the clear green of the leaf blades (author).

Ayacucho: Ccarrapa, 1,200 meters, *Killip & Smith 23229*. Bolivia.

Cestrum falcatum Francey, Candollea 6: 228. 1936.

Similar to *C. conglomeratum* but more or less puberulent, especially the younger parts, and the membranous leaves often plicate-falcate; petioles 6–8 mm. long, sulcate above where densely puberulent; stipuliform leaves on upper branches ovate-falcate, acute or acuminate, to 2 cm. long, half as wide, glabrous in age; leaves spreading or pendent, oblong-subovate to lanceolate, frequently unequal, acutely decurrent into petiole, attenuate and shortly acuminate at apex, 8–10 cm. long, 2.5– nearly 4 cm. wide, rigid, often plicate-falcate, the slender nerves 10–12, prominent beneath; flowers sessile, many in the leaf axils, the rachis 5–8 mm. long, densely tomentose; bracts lanceolate, acuminate, about 5 mm. long, the bractlets 2 mm. long, densely ferruginous-tomentose; calyx tubular-poculiform, 3.5–4 mm. long, 1.5–2 mm. thick, subterete, completely glabrous except the densely ciliate margins of the 5–6 triangular acute teeth, these 0.5 mm. long, 0.6 mm. thick; corolla 19 mm. long, tube contracted below ovary, finally obconic, little ampliate, 15.5 mm. long, glabrous or within obscurely puberulent; lobes 3.5 mm. long, nearly as wide, puberulent marginally; stamens 14.5–15 mm. long, free 3.5–5.5 mm., straight, smooth; ovary globose, 6-ovulate, the stout stipe glandular; style filiform, 1.5 cm. long, glabrous, the stigma capitate.—Resembles strongly *C. conglomeratum* but the leaves generally plicate (author); may prove to be a geographical variant but flowers longer and more slender, stipules present; *Soukup 3674* (det. Lyman Smith, *C. conglomeratum*) has the pubescence and leaves of *S. flexuosum* but the inflorescence of *C. conglomeratum* R. & P. and the ovate-falcate stipules of *C. falcatum;* it lacks the many subparallel nerves of *C. Mathewsii,* which otherwise it simulates; apparently new at least to

Peru, it may be noted as *C. falcatum* Francey var. **Soukupii** Macbr., var. nov., stipulis ovato-falcatis, 5–8 mm. longis, 3–5 mm. latis, foliis subtus sparse stellulatio-puberulis, corollis 1.5 cm. longis.

Used as a soporific (Herrera).

Lima: Concepción, Hacienda Ingenio, *Soukup 3674* (type, var.).—Cuzco: Río Urubamba, 2,800 meters, (*Herrera 734*, type). Hacienda de Urcos, *Karl Schmidt* (det. Standley, *C. conglomeratum*). "Nucjan" (Herrera).

Cestrum flexuosum Francey, Candollea 6: 179. 1936.

Branches flexuose, 1.7–4.5 mm. thick, tomentose-pulverulent toward the foliose tips; petioles slender, 9–12 mm. long; leaves oblong-lanceolate, slightly decurrent at acute base, long-acuminate, often unequal, about 6–7.5 cm. long, 2–2.5 cm. wide or somewhat wider, subcoriaceous, minutely revolute, glabrous, smooth, opaque above, sparsely puberulent all over beneath, reticulate-nerved, the midnerve as the 7–9 lateral prominent; stipuliform leaves none (or early deciduous); racemes axillary, peduncles flexuose, 2– nearly 7 cm. long, 5–7-flowered; pedicels 0.5 mm. long, glabrous, the subtending bracts oblong, acute, 13 mm. long, 6 mm. wide; calyx poculiform, scarcely costate above, 5 mm. long, 3.5 mm. thick, coriaceous, glandular but glabrous, 7-nerved, papillose within, the 7 unequal teeth acute, 0.5–0.8 mm. long, 1 mm. wide, marginally pilosulous; corolla 22 mm. long, the tube contracted below the ovary, cylindric, gradually ampliate to 4.5 mm. broad, obscurely constricted below limb, 19 mm. long, glabrous within and without, the 6 lobes 2.2 mm. long, acute or (explanate) obtuse, glabrous except the lanate margins; stamens 6, equal, 18 mm. long, the filaments free for 5.5 mm., geniculate, little dentate, slightly pilose; ovary globose, 20-ovulate, the filiform style verruculose-pilosulous at apex; stigma capitate; fruit black, globose, stipitate, 12 mm. thick, with 9 broadly oblong little compressed seeds 4–4.5 mm. long, 2–3 mm. broad, 0.7–1 mm. thick; cotyledons ovate.

Huánuco: Muña to Tambo de Vaca, 2,000 meters, *4310* type.

Cestrum foliosum Francey, Candollea 6: 260. 1936.

Glabrous or essentially, the branches sparsely verruculose, 5 mm. thick, the virgate elongate branchlets pulverulent only apically but exceptionally foliose; petioles 2.5–4 mm. long, little enlarged basally, scarcely canaliculate; stipuliform leaves persisting, geminate, acute,

2.5–6 mm. long, 2–3 mm. wide; leaves widely spreading (internodes only 6–12 mm. long), narrowly ovate-lanceolate, rounded or obtuse at base where little decurrent, long-acuminate, often 3.5–5 cm. long, 1–1.5 cm. wide, membranous, concolor, nitidulous, reticulate-nerved, the 7–8 arcuate lateral nerves prominent both sides; racemes axillary, leafy, 2–3 (–6) -flowered, the rachis 3–16 mm. long, obscurely puberulent, the floral leaves subsessile, ovate-lanceolate, 6–11 cm. long, 1–3.5 cm. wide, the bracts filiform, 1–1.5 mm. long; peduncle 1–1.5 mm. long, apically bracteate; pedicels 1–2 mm. long, glabrous or obscurely glandular; calyx cyathiform, 2.5 mm. long, 2 mm. across, glandular pilose only above, glabrous within, the 5 acute teeth 0.3 mm. long, 0.8 mm. wide, the nerves slender; corolla to 27.5 mm. long, tube below ovary suddenly, above gradually, contracted, long-cylindric, gradually ampliate three-fourths of its length, clavate at apex, 3.3 mm. broad, constricted below the limb, 23.5 mm. long, purplish without, greenish within, quite glabrous; lobes of limb 3 mm. long, glabrous without, glandular within, margins minutely puberulent; stamens unequal, about 23 mm. long, the filaments free for 2 mm., glabrous, smooth; ovary ellipsoid, shortly stiped, 6-ovulate; style 24.5 mm. long, very minutely puberulent toward the capitate stigma.—The flowers resemble those of *C. sparsiflorum* Britton, *C. papyraceum* Rusby and *C. rigidum* Rusby of Bolivia, the first with acuminate calyx teeth, stipuliform leaves none (apparently), the second with extremely thin leaves, filaments free for 1 mm., lateral nerves 9–10, and the third with filaments free for 3 mm., lateral nerves 9–13; stipuliform leaves persist in the latter two; here, as elsewhere in this genus where so many similar plants have been proposed as species, only much more observation will determine if the relatively slight variations upon which some have been based are constant and taxonomically significant. The author describes the leaves as membranous but also as rigid; in the herbarium they seem to be chartaceous; a specimen by Stork and Horton (*10153*) was referred to *C. peruvianum* Willd. by Standley, with query but probably sens. lat. correctly; in some herbaria it has been referred here but it seemed to me to be nearer *C. Raimondianum;* possibly more than one species was distributed under this number.

Huánuco: Villcabamba, Río Chinchao, *5203*. Bolivia.

Cestrum Franceyi Macbr., nom. nov. *Sessea pedicellata* Francey, Notizbl. Bot. Gart. Berlin 11: 882. 1933, not Sendt., 986.

Branches slender, early trigonous and densely pulverulent-puberulent, soon smooth and glabrate; petioles 12–25 mm. long, narrowly canaliculate, not enlarged at base, puberulent; adult leaves oblong- or elliptic-lanceolate, unequally acute or subacute at base, shortly and acutely attenuate at apex, 1.5 dm. long or longer, about 3.5–5 cm. wide (the narrower younger rounded at base, long-acuminate), subcoriaceous, minutely revolute, somewhat lustrous olive-green above, minutely stellate pilose beneath, reticulate both sides, the 11–13 lateral nerves nearly straight; stipuliform leaves none; lateral branches of panicles elongate, strongly dichotomous apically; flowers pale yellow, 21.5 mm. long, pedicels 1–1.5 mm. long, hirsute-pilose as calyx, this 5 mm. long, glabrous within, with 5 semiorbicular crenations 0.5 mm. long; corolla densely stellate-pilose, very acute lobes 2 mm. long; stamens unequal, filaments villous at medial insertion.—Type a 2-meter tall shrub; ovary densely pilose. Capsule 7 mm. long, 2.5 mm. thick, elongate, parted into 4 valves (Francey); Vargas specimen has shorter (but perhaps not fully developed) corollas and the leaves are pubescent as those of *S. discolor*.

Cuzco: Near Lares, 2,900 meters, Prov. Calca, *Weberbauer 7895*, type; *Vargas 3604?*

Cestrum glaucophyllum Francey, Candollea 6: 149. 1936.

Tree more or less stellulate-tomentulose, the trichomes often ferruginous and extending to the calyces without where more villous in character, the branches 3–6 mm. thick, the branchlets 1–2 mm., virgate; petioles 3–10 mm. long; leaves erect, narrowly ovate- or oblong-lanceolate, rounded or subacute at base but not decurrent, narrowly attenuate-acuminate, mostly 7–16 cm. long, 2–5 cm. wide, membranous, subrevolute, green and lustrous above, the midnerve slightly puberulent, obscurely reticulate, scarcely paler beneath but the 5–8 lateral nerves and the reticulate veins there prominent; stipuliform leaves none; spikes axillary, (1) 2–3-flowered, the filiform flexuose rachis 2.5–6 cm. long; peduncles short; bracts linear, petiolate, about 1 cm. long, marginally pilose; calyx lax, tubular-poculiform, to 14.5 mm. long (!), 4 mm. thick, slightly obconic below, glabrous within, 4–5-dentate, 5-nerved; teeth triangular-lanceolate, acuminate, 4.5 mm. long, often connate; corolla pale green, nearly 3.5 cm. long, the tube below the ovary manifestly, above scarcely, contracted, long-cylindric, abruptly ampliate at apex, 4 mm. broad, constricted below the limb, 2.5 cm. long, glabrous without and within, segments 8.5 mm.

long, incurved, narrowly lanceolate, acute or explanate, elliptic-lanceolate, obtuse, papillose-glandular without, glabrous within, or marginally puberulent; stamens 24.5 mm. long, the filaments free only 1.5 mm., smooth, glabrous; ovary globose, shortly stiped, 12-ovulate; style 2.5 cm. long, filiform, densely pilosulous at apex; stigma discoid; fruit oblong, sessile, 1.5 cm. long, 7.5 mm. thick, the 11 mature seeds oblong-angled acute, 4.5–5.5 mm. long, 0.7–1.2 mm. thick; cotyledons elliptic.—Suggests in character of calyx, leaves and indument the species *C. calycinum* HBK., *C. strigillatum* R. & P. and *C. cancellatum* Dunal; it differs from them essentially by the glabrous corolla tube (author). The fruit is tardily valvate at apex; thus toward section *Sessea*. Illustrated, Francey, l.c. 7: *pl. 1, fig. 34* (flower).

Junín: Pichis Trail, in dense forest, *Killip & Smith 25740*, type.

Cestrum Humboldtii Francey, Candollea 6: 393. 1936.

Related to *C. petiolare;* stipuliform leaves ovate, 4.5–7 mm. long, 3 or 4 mm. wide; leaves erect to spreading, ovate- or oblong-lanceolate, shortly acute or acuminate, 13–17 cm. long, about 7.5–8 cm. wide, subcoriaceous, not revolute, more or less densely puberulent on the nerves above, stellate-pilose, especially the nerves, beneath, the lateral nerves 13 or 14; panicles axillary, rather long-peduncled, rachis branched at base, 1.5–4.5 cm. long, bracts filiform, 4 or 5 mm. long, pilose; calyx tubular-poculiform, 4 or 5 mm. long, 2.5 mm. thick, densely pilose without, papillose within, the 5 teeth 0.8 mm. long and broad; corolla 16.5 mm. long, the tube purple, distinctly contracted only below the ovary (typically), scarcely ampliate, 3.7 mm. broad, 13 mm. long, glabrous without, the lobes triangular-lanceolate, 3 mm. long, glabrous or nearly except the margins glandular without; stamens 12.5 mm. long, filaments free for 5 mm., slightly geniculate 2 mm. above the insertion, reflexed pilose, not denticulate; fruit black, 4.5 mm. thick, 3 rugulose seeds 2.5–3 mm. long, 1.5–2 mm. broad, at least 1 mm. thick.—Var. *calycinum* Francey, 394, has oblong leaves, acute at base, petioles to 6.5 cm. long, calyx 6 mm. long, the often connate teeth 1.5 mm. long, corolla tube slightly clavate above, constricted below the limb, the lobes 3.5 mm. long, the stamens adnate three-fifths length of tube. With *C. petiolare*, this species is allied to Central American species *C. caloneurum* Pittier and *C. calycosum* Pittier (author). *C. Dielsii* Werd., Notizbl. Bot. Gart. Berlin 12: 373. 1934, from adjacent Ecuador (Río Pastaza valley), while of this alliance (author) has a short inflorescence.

Huánuco: Pampayacu, Río Chinchao, *5129*, type. Muña, trail to Tambo de Vaca, 2,400 meters, *4332* (type, var.).

Cestrum laevifolium Francey, Candollea 7: 62. 1936.

Type a small slender glabrous (unless floral parts) tree about 4.5 meters tall with elongate branches and narrowly oblong-lanceolate attenuately acuminate leaves about 1–1.5 dm. long, 2.5–5 cm. wide, decurrent on petioles 10–12 mm. long, subopaque above, lustrous beneath with 8 or 9 arcuate-ascending lateral nerves; stipules none; racemes axillary, the 6–8 subsessile whitish-green flowers 2.25 cm. long; bracts many, filiform, 1–1.5 mm. long; calyx tubular-campanulate, scarcely costate, 3.8 mm. long, papillose within, the 5 unequal teeth 0.6–0.9 mm. long, sparsely pilosulous; corolla pale green, infundibuliform, barbate within at base and at filament insertion, the lobes 3.5 mm. long, glabrous except the edges; filaments straight, 4 mm. free; ovary 6-ovulate; stigma capitate, included.—Extremity of the leaf is characteristic (author).

Junín: San Nicolas, Pichis Trail, *Killip & Smith 26074*, type.

Cestrum lanuginosum R. & P. Fl. Peruv. 2: 30, *pl. 157*. 1799; 168.

Erect shrub, known to attain about 2 meters, conspicuously lanuginose or lanate-hirsute except the older leaves above and the corollas, the latter quite glabrous within and without; branches lax, 1.5–3 mm. thick, the leafy axillary flowering branchlets 4–9 cm. long, 1–1.5 mm. thick; petioles densely lanate-hirsute, 5–7 mm. long, compressed; stipuliform leaves often obliquely ovate, about 2 cm. long, half as wide; mature leaves spreading or pendent, cordate-ovate or incised at base, scarcely decurrent, acute or subobtusely acuminate, about 6.5–10 cm. long, 4.5–7 cm. wide, membranous, slightly if at all revolute, early puberulent above, finally glabrate, lustrous, the 8 to 9 lateral nerves and reticulate veins rather prominent beneath; flowers 5–8-fasciculate at branchlet tips and in the axils of foliaceous acuminate bracts, 12–16 mm. long, 4–6 mm. wide, the filiform bractlets 1.5–3 mm. long, densely stellate-lanate; flowers sessile, the obconic-cyathiform calyx about 6 mm. long, 2.5 mm. thick, glabrous within, the 4 or 5 broadly ovate acute teeth 1.2 mm. long and wide, the nerves slender; corolla 24 mm. long, yellowish-green, the tube below the ovary suddenly, above gradually, contracted, in age obconic, scarcely constricted below the limb, 21 mm. long; lobes 2.5 mm. long, ovate, puberulent without, glabrous within, marginally tomen-

tose; stamens 4 or 5, 21 mm. long, the filaments free for 7 mm., this portion basally geniculate, often shortly dentate above, quite glabrous; anthers subcordate; ovary globose, glabrous, 10-ovulate, style capillaceous, 2.5 cm. long, minutely puberulent at tip; stigma capitate; fruit violet-colored, ellipsoid, sessile, 8 mm. long, 5.5 mm. thick, maturing 6 rugulose somewhat arcuate compressed oblong often truncate seeds 4.5–5.5 mm. long, 2.5–3 mm. broad, 1–1.5 mm. thick; cotyledons rotund.—Illustrated, Francey, Candollea 7: *pl. 1, fig. 50; fig. 59* (flower); *fig. 61* (calyx). F.M. Neg. 2984.

Huánuco: Near Pozuzo, *Ruiz & Pavón*, type.—Arequipa: Atiquipa, (*Raimondi 1312*); *Ruiz & Pavón* (Tafalla), type.

Cestrum longiflorum R. & P. Fl. Peruv. 2: 28, *pl. 154*. 1799; 235.

Known to attain 8 meters, the younger parts mostly lightly puberulent, as the leaves glabrous in age, the erect branches to 5 mm. thick; petioles at least 1 cm. long, arcuate or sometimes uncinate at base where enlarged; stipuliform leaves none; leaves spreading, ovate-oblong, subacute or rounded at base, acuminate, often 1– nearly 2 dm. long, nearly 3–7 dm. wide, subcoriaceous but rigid, very lustrous above, reticulate-veined both sides, the 18–20 lateral nerves impressed above, prominent beneath; panicles terminal, lax, 5.5–12 cm. long, the pulverulent rachis 2.5–5.5 cm. long, dark purple, peduncles branched, slightly lanuginose, 1.5 to many cm. long, the numerous flowers sessile or shortly pedicellate; bracts lanceolate-ciliate, 12 mm. long; calyx poculiform-tubular, basally obconic, 6–7 mm. long, 4 mm. thick, coriaceous, early obscurely glandular and very sparsely puberulent without or often essentially glabrous, pubescent within, the 5 nerves obscure, the 5 subobtuse teeth only 0.75 mm. wide; corolla nearly 4–5.6 cm. long, light green, the tube basally contracted, finally long-cylindric, apically ampliate, arcuate, 3–4.5 cm. long, 2–3 mm. across, quite glabrous; lobes of limb 9 mm. long, 3–4 mm. wide, acute, glabrous except the lanate margins; stamens equal, the filaments adnate to apex of tube, obscurely pubescent, the free part 2 mm. long, smooth; anthers subelliptic; ovary multi-ovulate, the disk glandular; style filiform, 4–5.7 cm. long, hirsute above; stigma capitate, puberulent; fruit ovoid, 2-celled, purplish, subsessile, 12–16 mm. long, 6–8 mm. thick, the subtending calyx cupuliform; seeds about 50, 2–3 mm. long, 1.5–2.5 mm. broad, 0.5–1 mm. thick, angled; cotyledons ovate.—F.M. Neg. 18393.

Huánuco: Chinchao, Macora and Cuchero, *Ruiz & Pavón*, type. Río Pozuzo, at the Río Palcazu, 1,800 meters, *Weberbauer 6779*. Río Hualyaco Canyon, below Río Santo Domingo, *4257*.—Junín: Palca, *Weberbauer 11995*. Huacapistana, *5820; Killip & Smith 24101*. "Yerba hedionda."

Cestrum loretense Francey, Candollea 6: 225. 1936.

A small shrub, glabrous except for some pubescence in the extremely short 5–8-flowered axillary spike; branches 3.5–4.5 mm. thick, conspicuously verruculose, the erect branchlets broadly sulcate, 2–3 mm. thick; petioles stout, 4–6 mm. long, stipuliform leaves none; leaves ascending, often curved toward apex, elliptic-lanceolate, attenuate to acute base but not decurrent, long-acuminate, often 1–2 dm. long, 4–7 cm. wide, coriaceous, not revolute, not or slightly lustrous both sides, the 8–10 lateral nerves impressed above, very prominent as the reticulate venation beneath; rachis of spikes to 7 mm. long, reddish-tomentose, the lanceolate acuminate bracts 3–7 mm. long, obscurely puberulent, the flowers sessile; calyx poculiform, angled, strongly costate, 4.5 mm. long, 2.5 mm. across, scarcely pilose without, glabrous within, the 5 triangular acuminate teeth 1 mm. long, puberulent marginally; corolla 2.5 cm. long, tube contracted below ovary, finally cylindric, gradually ampliate to the clavate apex, constricted below limb, 18.5 mm. long, glabrous without, barbate within on or near adnate portion of filaments, these free for 1.5–3.5 mm., straight, smooth, the acuminate lobes glabrous except the margins; ovary globose, 7-ovulate, the filiform style densely puberulent apically, 18 mm. long; stigma capitate; fruit shortly stiped, oblong, 8 mm. long, 5.5 mm. thick, maturing 4-angled costate compressed acute seeds 4–5.5 mm. long, 2.5–3 mm. broad, 1.5–2 mm. thick.—Marked by large leaves and conspicuously nerved calyx.

Loreto: La Victoria, *Williams 3129*, type.

Cestrum Macbridei Francey, Candollea 6: 262. 1936.

Type a small shrub 1.5 meters high, quite glabrous (but in fruit), the branches stout, 5 or 6 mm. thick, the elongate branchlets densely foliose; petioles 4–6 mm. long, canaliculate above, slightly incrassate at base; stipuliform leaves geminate, persisting, sessile, ovate-falcate, acute, 2.5–15 mm. long, 1–8 mm. wide; internodes 9–15 mm. long; leaves erect-spreading or widely spreading, narrowly lanceolate, acutely decurrent at base, narrowly long-acuminate or cuspidate, mostly 6–14 cm. long, 1–1.5 cm. wide, coriaceous, nearly concolor,

nitidulous, finely reticulate-nervose, the 13–14 arcuate ascending lateral nerves rather obscure above, obvious and flavescent beneath; spikes axillary, 4–6-flowered, the stout rachis to 13 mm. long; pedicels 1–2 mm. long, 2–3 mm. thick; fruit in calyx cupuliform, 2 mm. long, 5 mm. across, glandular without, the 5 nerves thick but not conspicuous, the 5 teeth triangular, acute, 1 mm. long, 2.5 mm. wide, margins obscurely puberulent; fruit black, sessile, ellipsoid, 8.5 mm. long, 6 mm. thick, the 4 immature seeds pale green.—Resembles *C. foliosum* Francey in stipules, position of leaves and branches but differs basically in form and dimension of leaves; also related to *C. rigidum* Rusby and *C. papyraceum* Rusby (author); some fruits have opened shortly at tip.

Junín: Hacienda Schunke near La Merced, 1,200 meters, *5724*, type.

Cestrum maleolens Macbr., nom. nov. *Sessea stipulata* R. & P. Syst. Veg. 1: 44. 1789 not *C. stipulatum* Vell.; 200.

Branchlets toward tip, leaves especially beneath and much-branched subcorymbose panicles more or less floccose-tomentose with candelabra-branched trichomes, this indument more or less reduced, extending to the calyx and ovary at apex; petioles often 2–2.5 cm. long; leaves membranous, lanceolate or elliptic-lanceolate, mostly obliquely rounded or more or less cordate, acutely or subobtusely acuminate, the larger often about 1 (–1.5) dm. long (gradually reduced upward), about a third as wide and commonly with 1 (or 2) sessile or petioled eventually deciduous stipuliform leaves opposite them, the persisting leaves sordid-green or drying brownish-rufescent above with 11 to 16 curved ascending prominent (somewhat impressed above) lateral nerves; inflorescences 1.5–2.5 dm. long; calyx narrowly campanulate-tubular, 7.5–8 mm. long, the acute or acuminate lanceolate teeth 1–1.5 mm. long; corolla 15–17 mm. long, glabrous only near base, the densely tomentose lobes 2–2.5 mm. long; filaments 6 mm. long with a few slender trichomes toward base (Bitter); ovary densely pseudostellate-tomentose at the bilobed apex; stigma obscurely bilobed; capsule exserted, 1 cm. long, glabrous below, 4-valved, the usually 4 alate seeds about 8 mm. long.—Miers described the filaments as retrorsely pilose. Sometimes a small tree 5 meters tall with a trunk diameter of 1.5 dm. near base; the flowers as well as the foliage have an extremely disagreeable odor; the capsule, black when mature, dries brown in herbaria. Illustrated, Miers, Ill. South Amer. Bot. *pl. 15*. F.M. Neg. 3006.

Huánuco: Acomayo, *Woytkowski 34263* (det. Cuatrecasas). Rondos, *Ruiz & Pavón.*—Junín: Huasahausi, *Ruiz & Pavón*, type. Bolivia.

Cestrum Mancoi Macbr., nom. nov. *Sessea Weberbaueri* Bitter, Repert. Sp. Nov. 18: 211. 1922, not *C. Weberbaueri* Francey, 1936.

Type a shrub 3 meters tall with subvirgate branches, rather similar especially in indument to *S. stipulata* R. & P. but the olive green leaves glabrate in age above, little paler beneath and stipule-like leaves lacking or caducous and calyx teeth obsolete; petioles about 1.5–2 cm. long; lower leaves at most 1 dm. long, 4 cm. wide, all mostly rounded and broader at base, gradually attenuate to obtuse or subobtuse tip, firm-membranous, the veins reticulate, impressed above; calyx tubular, (7) 8–9 mm. long, truncate; corolla sulphur yellow, about 2 cm. long, tube 5.5 mm. across at top, the narrowly triangular teeth 3 mm. long; filaments glabrous, scarcely 3 mm. long; stigma obtusely capitate.—F.M. Neg. 3007.

In *Cestrum* the name of this shrub may recall Manco Inca—not, unless by historical association, the legendary Manco Capac (cf. Prescott's "Conquest of Peru"). Manco Inca was the last of his race animated by the heroic spirit of the ancient Incas (Prescott). Now I have recorded in this work, at least to my own satisfaction, several of the better-known Inca personalities at about the time of Pizarro's conquest (cf. Field Mus. Bot. 11: 13, 15, 23. 1931).

Apurímac: Among evergreen shrubs on grass-steppes, 2,900 meters, Andahuaylas to Huancarama, *Weberbauer 5913*, type; *Velarde Nuñez 1388.*

Cestrum Mathewsii Dunal in DC. Prodr. 13, pt. 1: 637. 1852; 243.

Branches stout (to 8 mm. thick), broadly sulcate, brown-reddish, glandular with paler elliptic glands; petioles enlarged at base, scarcely canaliculate above, glabrous, 13–16 mm. long; stipuliform leaves auriculate-ovate or oblong, subobtuse, 5 or 6 mm. long and nearly 3 mm. wide; leaves widely spreading, oblong-lanceolate, long-attenuate to the often unequal base, not decurrent, long-acuminate and subcuspidate, about 13–16.5 cm. long, 2.5–3.5 cm. wide, subcoriaceous, rigid, subrevolute, lustrous especially beneath, glabrous both sides, the 18–21 lateral nerves parallel, little impressed above, prominent beneath; racemes axillary, subspicate, about 8-flowered, geminate or

ternate, sometimes solitary, the 7–11 mm. long rachis tomentulose; bracts many, linear, acuminate, strongly revolute, 4–6 mm. long; pedicels 0.5–1 mm. long, glabrous as the tubular-poculiform calyx without, this pilose within only above, 3–3.5 mm. long, 1.5 mm. thick, coriaceous, the 5 unequal teeth subacute, 0.7–1 mm. long, marginally densely pilose, the nerves thickened toward apex; corolla 14–18.5 mm. long, the tube scarcely contracted below ovary, gradually infundibuliform toward the middle, clavate to apex, constricted below the limb, 16 mm. long, completely glabrous; lobes of the limb ovate, 2.5 mm. long, glabrous without, obscurely puberulent within; stamens subequal, 14.5–15 mm. long, the filaments adnate (three-fifths) four-fifths their length, glabrous, the free part not tumid, smooth; anthers orbicular; ovary 4-ovulate, disk glandular; style 15.5 mm. long, densely but minutely puberulent above; stigma capitate.—The great number of primary nerves is characteristic (Francey). Simulates *C. conglomeratum* R. & P. but rachis, while short, is somewhat developed and leaves are entirely different; the corolla in type collection, Washington, as in the Conchán shrub is usually 15–17 mm. long, the filaments of the latter free for 5 mm. F.M. Neg. 8576.

Cajamarca: South of Conchán, Prov. Chota, 2,500 meters, *Stork & Horton 10068*.—Amazonas: Chachapoyas, *Mathews*, type, Geneva Herbarium.

Sessea multiflora Bitter, Repert. Sp. Nov. 18: 212. 1922, not *Cestrum multiflorum* R. & S.

Related and similar to *C. Mancoi;* petioles of larger leaves 2.5–3 cm. long; leaves very sparsely puberulent above, oblong-lanceolate, the lower about 1.5 dm. long, 5– nearly 6 cm. wide, often with 1–2 sessile obtuse leaves about 1 cm. long and wide in the axils; lateral nerves 14–16, the veins scarcely articulate-impressed; panicles ample, to 2.5 dm. long; calyx truncate, tubular-campanulate, 5–5.5 mm. long; corolla tube 4–5 mm. broad at apex, lobes ovate, 3.5 mm. long; filaments 7 mm. long, with a few branched and simple trichomes toward base; stigma obliquely capitate; capsule obovoid-ellipsoid, 7 mm. long, 3 mm. thick, the 4 coriaceous valves glabrous below for 5 mm.—*S. Herzogii* Damm., Meded. Herb. Linden 29: 1916, of Bolivia, has densely flowered corymbs about 5 cm. long, the stellate pilose leaves obviously reticulate-veined above. Type near a house where perhaps planted or cultivated (Weberbauer). My collections were distributed by me as *S. stipulata* R. & P.; they seem to be intermediate to *S. multiflora* and *S. discolor* Francey; like the latter, if

valid, it requires in *Cestrum* a new name. From a tree 3–5 meters tall. F.M. Neg. 3005.

Huánuco: Mito, *1486*. Yanahuanca, *1235*.—Puno: Sandía, 2,400 meters, *Weberbauer 599*, type.

Cestrum nemanthum Dunal in DC. Prodr. 13, pt. 1: 637. 1852; 306.

Glabrous, or noticeably puberulent only in the very short axillary spikes, the branches curved, 3–4 mm. thick, the branchlets spreading or pendent, foliose to apex, floriferous entire length; stipuliform leaves none; petioles 6–10 mm. long, canaliculate above, incrassate at base; leaves erect or pendent, deciduous from the branches, oblong- or elliptic-lanceolate, narrowed to base and decurrent, subobtusely acuminate, 9–15.5 cm. long, 2.5–7 cm. wide, subcoriaceous or chartaceous, plane, concolor, rather lustrous, the 6 to 7 lateral nerves only moderately conspicuous either surface; spikes 2–5-flowered, the pulverulent rachis 1–5 mm. long, the bracts hardly 1 mm. long; flowers subsessile; calyx tubular above a cyathiform base, annulate, 3 mm. long, 1.7 mm. thick, obscurely puberulent without, glabrous within, the 5 nerves stout, the 5 acute teeth 0.5 mm. long, 0.7 mm. wide, apically pilose; corolla 15.5 mm. long, tube contracted above and below ovary, finally infundibuliform, slightly ampliate to apex, constricted below limb, 12 mm. long, entirely glabrous; lobes 3.5 mm. long, tomentulose without, puberulent within, stamens 10 or 11 mm. long, the filaments adnate only to middle of tube, free for 4 or 5 mm., smooth, at middle and base of tube pilose; ovary globose, obconically stiped; style 11 mm. long, incrassate toward tip, glabrous; stigma capitate.—This is distinguished from *C. Baenitzii* Lingels. by the form of the leaves; these are unique because all the nerves, while visible, are rather obscure, the leaves thus having a soft smooth appearance on both surfaces (Francey); type, fide Dunal, by Claussen! So the citation must be a lapsus calami by the author or by Francey; compare *C. silvaticum* Francey or perhaps *C. loretense.*

Huánuco: Chicoplaya, (*Ruiz & Pavón*, type, Geneva, fide Francey). Brazil.

Cestrum obscurum Francey, Candollea 6: 302. 1936.

Glabrous or essentially except the short axillary racemes, these 1.5–2 cm. long, 3–5-flowered, often geminate or ternate; branches flexuose, 2–3 mm. thick, angulate and somewhat sulcate toward the dark purple tips; stipuliform leaves none; petioles canaliculate above,

7–12 mm. long; leaves spreading, oblong or elliptic, acute or narrowed and decurrent at base, shortly acuminate or very acute, many 9–12 cm. long, about 3–6 cm. wide, membranous but rigid, undulate, often bullate, subopaque above, pale and opaque beneath, the midnerve there prominent and dark brown as the 9 or 10 arcuate lateral nerves; rachis about 7 mm. long, filiform, glabrous; peduncles only 0.5–2 mm. long, the bractlets scarcely 1 mm. long, puberulent; flowers sessile; calyx tubular, 2.5 mm. long, 1.5 mm. thick, quite glabrous including the 5 ovate acute teeth, these 0.7 mm. long, 1 mm. wide; corolla green, 15.5 mm. long, the tube not constricted, scarcely ampliate at apex, 13 mm. long, entirely glabrous; lobes 2–2.5 mm. long, acuminate or very acute, puberulent only without, the margins there tomentulose; stamens 12.5 mm. long, free for 2.5 mm., smooth, long-pilose for three-fifths their length; ovary subquadrate; style 12 mm. long, glabrous, the stigma capitate.—The deep purple of the branches, the flowering peduncles, the abruptly decurrent leaves on the petiole and the slender flowers are the unique characters of this species (author). Illustrated, Francey, l.c. 7: *pl. 2, fig. 54* (flower); *pl. 3, fig. 52* (calyx).

Junín: La Merced, (*Weberbauer 1930*, type).

Cestrum osnoense Macbr., nom. nov. *Sessea graciliflora* Bitter, Repert. Sp. Nov. 18: 214. 1922, not *C. graciflorum* Francey.

In indument and many other characters resembles *S. multiflora* Bitter; branches suberect, densely yellowish floccose-tomentose, as the leaves beneath; petioles 2.5–3.7 cm. long; leaves elliptic or ovate-elliptic, the larger 1–1.5 dm. long to 6 cm. wide, veins impressed above; calyx tubular, truncate, 3–3.5 mm. long; corolla narrowly tubular, 22 mm. long, only 3 mm. across at apex, the rhomboid-triangular lobes 3 mm. long; filaments 5–6 mm. long, rather densely and simply pubescent; ovary densely pubescent all over; stigma obliquely capitate.—A shrub, 3 meters high, or probably more or less, with divaricately much-branched inflorescence. F.M. Neg. 3004.

Ayacucho: Between Tambo above Osno and the Río Apurímac, 3,200 meters, *Weberbauer 5582*, type.—Cuzco: Paucartambo, *Soukup 396* (det. Standley, *S. discolor*).

Cestrum ovalifolium Francey, Candollea 6: 362. 1936.

Generally resembles *C. Dunalii;* flowering branchlets ordinarily 5 cm. long; leaves widely divaricate, ovate or subelliptic, rounded or obtuse at base but shortly decurrent and notably shortly acuminate,

3–5.5 cm. long, 1.5–3 cm. wide, membranous but very rigid and fragile, the lateral nerves 5–7, the reticulation lax beneath; racemes axillary and at the apex of terminal branches 5- or 6-flowered, the rachis 1.5 to scarcely 3 cm. long; pedicels 1.5–2.2 mm. long, the lower 1-flowered; peduncles 1 cm. long, the upper 2–3 mm. long; bracts filiform, acuminate, to 2.5 mm. long; calyx tubular-campanulate, terete, 4 mm. long, 2 mm. thick, the 5 equal teeth marginally puberulent, the nerves not prominent; corolla 24 mm. long, ampliate three-fourths the length, above clavate, 3 mm. across, constricted below the limb, 16.5 mm. long, the lobes 7 mm. long, acutely acuminate; stamens free for 3.5 mm., denticulate at the insertion, quite glabrous as the tube all over; style 16 mm. long.—The species is characterized by the regularly oval or less generally elliptic leaves with a short apical point (author). Illustrated, Francey, l.c. 7: *pl. 2, fig. 32* (flower).

Cajamarca: Cutervo, *Jelski 6549*, type.

Cestrum ovatolanceolatum Francey, Candollea 6: 279. 1936.

Type a tree 12 meters high, glabrous except the lax many-flowered axillary panicles, these 2.5–3 cm. long or longer; branches 3.5–4 mm. thick, the flexuose brownish-purple branchlets broadly sulcate; internodes mostly 2–3 cm. long; petioles 8–11 mm. long, canaliculate above; leaves alternate, widely divaricate, ovate-lanceolate, obtuse or rounded at the scarcely decurrent base, long-attenuate to the shortly acuminate or very acute apex, broadest at one-fourth their length, mostly 9–11 cm. long, 3.5–5 cm. wide, membranous, obscurely puberulent above, subopaque and entirely glabrous beneath, the prominent midnerve there brownish-purple, the 10–13 lateral nerves obvious as the reticulate venation; stipuliform leaves none; basal branches of the panicles 3–7 mm. long, 2–4-flowered, the lanceolate puberulent bracts 5 or 6 mm. long, 1–1.5 mm. wide; flowers sessile, pale, greenish-yellow; peduncles often filiform, the bractlets acuminate, subfiliform; calyx obconic-poculiform, subterete, 2 mm. long, 1–1.5 mm. thick, puberulent only without as the 5 often connate acute teeth, these 0.3 mm. long, 0.5 mm. wide, the nerves slender; corolla 10.5 mm. long, tube contracted below ovary, ampliate to apex, not constricted below limb, 8.5 mm. long, 2.5 mm. broad, quite glabrous as the acute 2 mm. long lobes except the puberulent margins; stamens 8.5 mm. long, the filaments free for only 0.5 mm. long in type, smooth, slightly pilosulous; ovary globose above, cylindric below, 6-ovulate; style 8.5 mm. long, apically pulverulent; stigma

capitate.—The form of the leaves, the reduced dimensions of the flower, and the form of the corolla tube characterize this species (author). The name was originally written with a hyphen. Klug specimen with somewhat longer corolla, filaments free for several mm. is doubtful; it may be rather a variant of *C. racemosum* R. & P.

Loreto: Balsapuerto, *Klug 2942?*—Junín: La Merced, at about 600 meters, *5435*, type.

Cestrum peruvianum Willd. ex Roem. & Schult. Syst. 4: 807. 1819; 7: 3 (species no. 208). *C. affine* HBK. Nov. Gen. & Sp. 3: 60. 1818, not Persoon.

Foetid nearly glabrous shrub or small tree, only the triangular acute calyx and corolla lobes marginally puberulent, the latter all over without; petioles 5–8 (–12) mm. long, gibbous-enlarged at base; leaves spreading, elliptic- or oblong-lanceolate, little decurrent at the acute or subobtuse base, acuminate, 7–17.5 cm. long, 1.5–4.5 cm. wide, membranous, revolute, lustrous, brownish or somewhat purplish-green, the 14–15 lateral nerves spreading, little prominent above, the veins reticulate; stipuliform leaves oblong-lanceolate, 3–5 mm. long; spikes axillary, the 6–9 subsessile flowers crowded apically, 21.5 mm. long; bracts elliptic-lanceolate, 3–5 mm. long; calyx tubular-poculiform, 5–6-costate-dentate, 4.5–5 mm. long, 2 mm. thick, the acute teeth 0.5 mm. long; corolla whitish-green or sulphur-colored, 19 mm. long, tube strongly constricted, pilose within below filaments, these 6–8 mm. free, more or less dentate; lobes 5 or 6, glabrous within, 3–3.5 mm. long; stamens 5 or 6, subequal; ovary long-stiped, 14–16-ovulate; stigma discoid, included.—Known to attain 4 meters. F.M. Neg. 2964.

Piura: Ayavaca, *Bonpland*, type. Palambla, *Soukup 4287*.—Cajamarca: Chota, *Jelski 5477*. Nanchó, *Raimondi*.—Amazonas: East of Chachapoyas, *Weberbauer 4442*.—Ancash: Llata, *2294*.—Junín: Near Chacapalca, *Raimondi*. To Colombia. "Yerba Santa" (Raimondi).

Cestrum petiolare HBK. Nov. Gen. & Sp. 3: 58. 1818; 391. *C. venosum* Willd. ex Roem. & Schult. Syst. 4: 807. 1819(?).

More or less densely floccose-tomentose, becoming pulverulent in age or the leaves above even glabrous; branches stout, angled, 3.5–5 mm. thick; stipuliform leaves more or less lunulate, 1–1.5 cm. long, about half as wide, glabrous; petioles 1.5 cm. to nearly 4 cm. long, angled, canaliculate; leaves erect, ovate- or elliptic-lanceolate, acute,

cuneate or rounded at base, shortly acuminate, 1–2 dm. long, 4–9 cm. wide, or even larger, membranous but rigid, minutely revolute, rather lustrous both sides but much paler beneath, the midnerve as the 20–24 parallel lateral nerves (Francey) prominent beneath, laxly reticulate; panicles in axils and terminal, the rachis 1–9 cm. long, the peduncles 1–5 mm. long; flowers sessile, congested; calyx tubular-campanulate, 6–6.5 mm. long, 3 mm. thick, glabrous without, pubescent within, the 5 teeth equal, acute, 1.5 mm. long, the nerves stout, lateral nerves many; corolla white or yellowish-green, 18 mm. long, the tube not contracted, regularly infundibuliform, the limb continuous, 15.5 mm. long, entirely glabrous as the semi-orbicular lobes without, these 2.5 mm. long, acute or subobtuse (explanate), puberulent marginally and within; stamens 13.5 mm. long, subequal, the filaments adnate to the middle, free for 6.5 mm., reflexed pilose, recurved, not incrassate, smooth; ovary papillose, clearly stipitate, 8-ovulate, the style 1.5 cm. long, enlarged apically, puberulent, the stigma capitate, discoid; fruit globose, obtuse, 2 mm. long and thick; seeds 2, 2.5 mm. long, 1 mm. broad, 0.5 mm. thick; cotyledons cordate.—Flowers (and fruit) except calyx unknown in type; description (as others) after Francey, who uses the name of Willdenow.

Piura: Ayavaca, (*Bonpland*, type). To Colombia.

Cestrum pseudopedicellatum Francey, Candollea 7: 29. 1936.

Glabrous or essentially, except for evanescent puberulence at the tip of the elongate flexuous branchlets, these only 1–2 mm. thick; stipuliform leaves none; petioles often uncinate at base, 7–10 mm. long; leaves spreading or pendent, oblong-lanceolate, acute or cuneate at base, shortly acuminate, many 6–8 cm. long, about 3 to nearly 4 cm. wide, membranous, opaque above, slightly lustrous beneath, the 8 or 9 arcuate nerves and reticulate veins prominent beneath; racemes axillary in a foliose terminal panicle, 3–6-flowered, the dark purple branches to 5 cm. long, 1-flowered peduncles 5–12 mm. long, pedicels 0.7 mm. long, flowers 33 mm. long; bracts oblong-lanceolate, 1–1.5 cm. long, bractlets filiform, 4–9 mm. long, both long-attenuate to base; calyx (in herb.) coriaceous, subtubular, narrowly obconic-poculiform, 5 mm. long, 3 mm. thick, obscurely puberulent only within, the 4 or 5 often coalescent teeth acute, ciliolate; corolla infundibuliform, 32 mm. long, tube contracted below ovary, cylindric to middle, gradually ampliate to 5.5 mm. across at apex where purple and glabrous, the often plicate lobes 3.5 mm. long, marginally puberulent, glandular; filaments 8.5 mm. free, gibbous, bent, subdenticu-

late, only the adnate part faintly pulverulent; ovary shortly stiped, 14-ovulate; style hirtellous at tip, the exserted capitate stigma puberulent.—Flowers notable in dimensions, the pedicels very short but the peduncles very long (author).

Peru: (Without data at Geneva, *Weberbauer 6675*, type).

Cestrum racemosum R. & P. Fl. Peruv. 2: 29, *pl. 154*. 1799; 273.

Glabrous in age except the racemiform panicles, the younger branchlets and leaves sparsely pulverulent-puberulent; branches erect, 3 mm. thick, purplish, lustrous as the spreading branchlets, these to 2 dm. long, compressed, angled; petioles 7–16 mm. long; stipuliform leaves none; leaves spreading or pendent, ovate-lanceolate, rounded at base, narrowly subobtusely or acutely acuminate, often 1–1.5 dm. long, 2.5–5 cm. wide, membranous, plane or nearly, lustrous, especially above, the 13–15 lateral nerves prominent beneath; panicles axillary, 1–3, about 10-flowered, the axis 1–2 cm. long, pulverulent-tomentose; peduncles little branched, 2–5 mm. long, 2–3-flowered, minutely lanuginose; flowers greenish, sessile; bracts linear-acuminate, 2–3 mm. long, pilosulous as the tubular poculiform calyx without, this 1–2 mm. long, 1–1.5 mm. thick; calyx teeth 5, unequal, 0.3–0.7 mm. long, 0.7 mm. wide, pilose at acute apex; corolla infundibuliform, about 1.5 cm. long, tube contracted below and above ovary, inflated at apex, not constricted below limb, 12.5 mm. long, quite glabrous; lobes of limb 3 mm. long, pubescent only without, the margins tomentulose; stamens 11 mm. long, the filaments 1–2 mm. free, smooth, only the adnate part pubescent below; ovary globose; style 11.5 mm. long, glabrous; stigma capitate; fruit ellipsoid, subsessile, 4.5 mm. long, 3 mm. thick, maturing 3 elliptic or ovate-oblong seeds 4 mm. long, 1.5 mm. broad, 0.7 mm. thick; cotyledons oval.—Illustrated, Francey, l.c. 7: *pl. 3, fig. 20* (flower).

San Martín: Tarapoto, *Williams 6620; Spruce 4552*.—Huánuco: Chinchao and Macora, *Ruiz & Pavón*, type. Monzón, *Weberbauer 3434*.—Loreto: Pongo de Manseriche, (*Tessmann 4269*). Bolivia to Central America. "Yerba hedionda" (Ruiz & Pavón).

Cestrum Raimondianum Francey, Candollea 6: 382. 1936.

Allied and similar to *C. undulatum;* stipuliform leaves none (in type); petioles 4–7 mm. long, slightly incrassate and uncinate at base; leaves erect to spreading, oval or oblong, acuminate, shortly

decurrent at acute base, 4.5–6 (9) cm. long, about 2–3.5 cm. wide or slightly wider, membranous but rigid, obscurely pulverulent on the midnerve beneath, the lateral nerves 6–8 (type); panicles axillary, 6–8-flowered, the lower subracemose, the upper subspicate; peduncles obsolete, bractlets filiform, minute; pedicels 1.3 mm. long; calyx tubular, slightly 5-costate, 4 mm. long, 1.6 mm. thick, papillose within, the 5 acuminate teeth often connate with rounded sinus; corolla 24.5 mm. long, tube below and above ovary contracted, very narrowly obconic, ampliate to apex, 3 mm. broad, constricted below the limb, 18.5 mm. long; lobes 5.5 mm. long, acute; stamens 17.5 mm. long, the filaments 4 mm. free, geniculate at insertion, incrassate, not denticulate; ovary globose, 6-ovulate, style 17.5 mm. long; fruit sessile, oblong, 6.5 mm. long, 4.5 mm. thick, the subtending calyx cupulate; seeds (immature) 6.—The species particularly marked by its relatively large oval or oblong leaves; Stork & Horton collection has leaves with 12 or more nerves, in this respect suggesting *C. undulatum* R. & P. Illustrated, Francey, l.c. 7: *pl. 3, fig. 48* (flower).

Cajamarca: Río Socota, Prov. Cutervo, *Stork & Horton 10153* (distr. as *C. affine* with query, i.e. *C. peruvianum*).—Amazonas: Lamas, (*Raimondi 1055*, type). "Yerba Santa."

Cestrum reflexum Sendtn. in Mart. Fl. Bras. 10: 218. 1846; 265.

Branches elongate, flexuose, more or less scandent or at least supported in other shrubs, glabrous as entire plant except for some puberulence on the younger parts, the leaves beneath near the midnerve and the panicles; internodes 2.5–3 cm. long, the leaf scars very prominent; petioles slender, often uncinate at base, 6–10 mm. long; stipuliform leaves deciduous, ovate, about 5 mm. long, 2–3 mm. wide; leaves pendent, oblong- or subovate-lanceolate, acute or obtuse, often unequal at the little decurrent base, acuminate or acute, mostly 8–10 cm. long, 3.5–5 cm. wide, membranous, plane, lustrous both sides, the 7 or 8 strongly ascending lateral nerves prominent only beneath, the veins obviously reticulate on both surfaces; inflorescences axillary, 10–15-flowered, foliose racemes or the upper forming an elongate panicle, the lateral branches 1–3.5 cm. long; floral leaves ovate- or oblong-lanceolate, 8–14 mm. long, half as wide; terminal panicles about 1.5 dm. long or longer, the lanceolate or sublinear bracts 2.5–5 mm. long, the flowers sessile; calyx campanulate, slightly angled above, 3–3.5 mm. long, 3 mm. across, sparsely puberulent only without, the 5 nerves slender, the 5 spreading teeth 0.5–0.7 mm. long, 1 mm. wide, ciliate; corolla yellowish-tinted, 25.5–27.5 mm. long, the

tube constricted below the ovary, abruptly ampliate at apex, cupuliform, more or less constricted below the limb, 17.5–21.5 mm. long, quite glabrous; lobes elliptic- or ovate-lanceolate, 5 or 6 mm. long, glabrate both sides, marginally subtomentose; stamens 17.5–20.5 mm. long, the free part of filaments 1.5–2 mm. long, glabrous, smooth; ovary globose, attenuate into stipe, 16-ovulate, the style 18–21 mm. long, obscurely puberulent apically, the puberulent stigma capitate; fruit sessile, ellipsoid, 8.5 mm. long, 6.5 mm. thick, the subtending calyx cyathiform, 5 mm. long, 6 mm. across; seeds 8–11, oblong, 3.5–5 mm. long, 2–2.5 mm. wide, about 1 mm. thick; cotyledons elliptic.—Illustrated, Francey, l.c. 7: *pl. 1, fig. 72* (flower).

Cajamarca: Monte Seco, Prov. Hualgayoc, *Soukup 3884*.—San Martín: Tocache, *Poeppig*. Tarapoto, *Williams 5782; 6169; Spruce 4418*.—Loreto: Florida, *Klug 2061; 2350*. Lower Río Huallaga, *Williams 4286; Killip & Smith 29267*.—Cuzco: Quellouno, Prov. Convención, *Vargas 6331*. Southwestern Brazil to Central America.

Cestrum Sendtnerianum Mart. ex Sendtn. in Mart. Fl. Bras. 10: 215. 1846; 344.

A much-branched shrub sometimes becoming an elegant tree, quite glabrous except for obscure or sparse indument in the flowers; branches stout, 3.5 mm. thick, verruculose, the branchlets elongate, lustrous, brownish-purple toward the tip, the flowers borne at the apex of the younger, or solitary or 2–4-fasciculate in the leaf axils; petioles 2–11 (18) mm. long, incrassate at base; stipuliform leaves lanceolate, subsessile, obtuse, 7–10 mm. long, to 4 mm. wide; leaves crowded, often plicate-falcate, ovate- or oblong-lanceolate, acutely or acuminately decurrent, long-acuminate or cuspidate, ordinarily 3.5–10 cm. long, 1.5–5 cm. wide, rarely larger, membranous, not or obscurely revolute, lustrous especially above, reticulate nervose, the 5–7 lateral nerves prominent only beneath; pedicels to 0.6 mm. long, bracts lanceolate-acuminate, 4.5 mm. long, pulverulent; calyx ovate-cylindric, rather strongly 5-nerved, subcoriaceous, 2.5–4 mm. long, 1.5–2.2 mm. thick, glabrous except the ciliate margins of the acute teeth; corolla purplish or greenish yellow, about 2.5–3 cm. long, the coriaceous tube contracted below the ovary, slightly tumid above, finally narrowly obconic and gradually ampliate, constricted below the limb, 19.5–24 mm. long, glabrous without, only the margins of the ovate lobes (4–5 mm. long) tomentulose; stamens 19–23 mm. long, the free part 3.5 mm. long, denticulate at or just below insertion, the teeth and subgibbous adnate portion pilose; ovary

globose, 6-ovulate, with obconic glandular stipe; style 19–23 mm. long, puberulent at apex, the stigma capitate; fruit dark violet, sessile, ellipsoid, 13 mm. long, 7 mm. thick; seeds 4 to 6, dorsally canaliculate, 5.5–6.5 mm. long, 2–3.5 mm. broad, 0.7–1 mm. thick; cotyledons elliptic.

San Martín: San Roque, *Williams 7285; 7638.* Tarapoto, *Williams 6881; Spruce 4277.* Tocache, *Poeppig 2039.*—Loreto: Near Iquitos, *Klug 436; 877; Williams 1469; Tessmann 3564.* Pebas, *Williams 1649.* Caballo-cocha, *Williams 2128.* Río Nanay, *Williams 663.* Lower Río Huallaga, *Williams 4522; 6881.* Argentina to Costa Rica. "Yerba Santa."

Cestrum silvaticum Francey, Candollea 6: 316. 1936.

Glabrate or obscurely puberulent on the younger parts and the leaf midnerve both sides; branches flexuose, 1.5–4 mm. thick, sparsely glandular-verruculose; stipuliform leaves semi-lunate, glabrous, 1–1.5 mm. long, 0.8 mm. wide, deciduous; petioles 1–1.5 cm. long; leaves erect to spreading, elliptic-lanceolate, acutely decurrent, acuminate or shortly cuspidate, about 1–1.5 dm. long, 3–4.5 cm. wide, membranous, obscurely revolute, little if at all lustrous above, paler and opaque beneath, reticulate both sides, the 8–12 lateral nerves arcuate ascending; panicles axillary, 5–10-flowered, the basally branched sparsely puberulent rachis 4–16 mm. long; bracts elliptic-lanceolate, obtuse, 4 mm. long, the filiform bractlets minute; peduncles at most 2 mm. long, pedicels 0.5 mm. long, glabrous as the cyathiform calyx, this about 3 mm. long, 1.5 mm. across, obscurely verruculose-glandular; teeth 5, equal, 0.4 mm. long, 0.6 mm. wide, acute, pilosulous marginally, the sinus acute, the nerves slender; corolla nearly 2 cm. long, the tube contracted below the ovary, very narrowly obconic, apically ampliate, 2.8 mm. across, constricted below the limb, 15.5 mm. long, glabrous without, barbate within for two-thirds the length, adnate portion of filaments free for 3.5 mm., smooth; lobes of limb 3.3 mm. long, glabrous except the densely puberulent margins; ovary ellipsoid, 8-ovulate, the disk glandular; style filiform, 16 mm. long, obscurely pubescent apically, the stigma capitate; fruit 5.5 mm. long, 3.5 mm. thick but immature. —Strongly resembles *C. tenuissimum* Francey, 248, of Bolivia but differs by the size of calyx with acute sinus, by the short 1-flowered peduncles and by the somewhat pilose filaments (author); however, see *C. Baenitzii; Klug 3612,* referred there by Standley, seems to be intermediate.

San Martín: Pongo de Cainarachi, *Klug 2690* (det. Morton).—Junín: Pichis Trail, *Killip & Smith 25483*, type. La Merced, *5645*.—Loreto: Above Pongo de Manseriche, *Mexia 6251*. Florida, Río Zubineta, *Klug 2136*. "Mitira-ey" (Klug).

Cestrum strigillatum R. & P. Fl. Peruv. 2: 29. 1799; 142. *C. unibracteatum* Dunal in DC. Prodr. 13, pt. 1: 656. 1852, fide Francey. *C. calycinum* HBK. Nov. Gen. & Sp. 3: 58. 1815 (as var. below). *Sessea rugosa* Rusby, Bull. N. Y. Bot. Gard. 8: 119. 1912, fide Francey.

Typically a virgately stemmed branched shrub, the younger parts and the leaves beneath, especially the nerves, lightly to lanate-tomentose; branches to 5 mm. thick, strigose-pulverulent in age; stipuliform leaves none; petioles 5–10 mm. long, canaliculate above; leaves spreading, ovate to ovate-lanceolate, basally rounded or cordate, acute or acuminate, 0.5–2 dm. long, 4–10 cm. wide, membranous, plane or nearly, glabrous and lustrous above, the 6–8 lateral nerves prominent beneath; panicles more or less racemose, axillary, solitary or geminate, several to 10 cm. long, 6–many-flowered, the rachis to 9 cm., strigose-pulverulent; peduncles 5–16 mm. long, the 1-flowered 1–3 mm. long, filiform, apically much incrassate; flowers sessile, basal bractlets 3–5 mm. long, linear-acuminate, densely tomentose; calyx tubular-poculiform, angled, 10–12 mm. long, 4–4.5 mm. thick, early tomentose without, glabrous within, the 5 ovate ciliate teeth to 2 mm. long, nearly as wide, slender nerves prominent, lateral many; corolla yellowish-green, 3–3.5 cm. long; tube contracted below the ovary, cylindric, slender, strongly ampliate at apex, above calyx strigose-tomentose, glabrous within, not constricted below the limb, the latter with oblong-lanceolate or elliptic-lanceolate acute lobes 9–12 mm. long, 4–5 mm. wide, tomentose without, glabrous within; stamens 24 mm. long, the filaments only free for 1 mm., smooth, glabrate; ovary globose, with obconic stipe; style 24 mm. long, hirsutulous toward apex, the capitate stigma lobulate; fruit ellipsoid, sessile, 11 mm. long, 6 mm. thick, the calyx accrescent; seeds 7, 5 mm. long, 2 mm. broad, 1 mm. thick; cotyledons elliptic.—Young fruit has a crossed scar at apex as in *Sessea* (Francey). The var. *calycinum* (Willd.) Kuntze, Rev. Gen. 3: 220. 1893, treated as specifically distinct by Francey, l.c. 137, and perhaps logically, is distinguished primarily by more generally distributed, softly stellate tomentose indument and especially by the rather crowded flowers, these sometimes subfasciculate or in subspicate 4–7-flowered

racemes 2–4 cm. long. Flowers with fragrance of jasmine; infusion of leaves used for tonic (Seibert). Illustrated, Francey, l.c. 7: *pl. 1, fig. 32* (flower). F.M. Negs. 18394; 2998 (*C. calycinum*); 6899 (*C. unibracteatum*).

Cajamarca: Gonzanama, (*Bonpland*, type, *C. calycinum*).—San Martín: Bellavista to Baños, *Ferreyra 4746* (det. Cowan). San Roque, *Williams 7223; 7353*. Tarapoto, *Williams 5566; 6570* (var.); *Spruce 4164; 4164a* (var.). Moyobamba, *Raimondi; Woytkowski 35302* (var.). Chazuta, *Klug 4130* (var.).—Huánuco: Cuchero, *Dombey* (type, *C. unibracteatum*); *Poeppig 96*. Pozuzo and Río Chinchao, *4778; 5034; Ruiz & Pavón*, type; *Poeppig 1326*.—Junín: Palca to Chanchamayo, *Raimondi*. Colonia Perené, *Killip & Smith 25420*. La Merced, *5329; 5588; Killip & Smith 23673; 23385*.—Loreto: Yurimaguas, *Williams 4775; 4857; 5288; Killip & Smith 28223* (var.); *28347* (var.). Puerto Arturo, *Killip & Smith 27780* (var.); *28043* (var.).—Ayacucho: Huanta to Río Apurímac, *Killip & Smith 23216* (var.); *23100*.—Cuzco: Santa Ana, *Raimondi*.—Madre de Díos: Iberia, *Seibert 2019* (var., det. A. C. Smith); *2151*. Uruguay to Colombia. "Ucha Panga" (Williams), "Santa María" (Seibert).

Cestrum tomentosum L. f. Sp. Pl. Suppl. 150. 1781; 171.

A canescently stellate-tomentose shrub rather similar to *C. lanuginosum;* petioles 3–12 mm. long, terete; leaves oblong- or ovate-lanceolate, rounded, obtuse or subacute at base, not decurrent, attenuately acuminate or acute, 7 to about 12 cm. long, usually 2.5–5 cm. wide, membranous or subcoriaceous, very sparsely stellate-pilose above, the lateral nerves 7–9, the younger leaves obtusely acuminate, naturally smaller, the floral oblong, acute, 6–8 mm. long and half as wide; stipuliform leaves geminate, mostly persisting, ovate or oblong-lanceolate, about 1–2 cm. long, half as broad; flowers 3–5-fasciculate; bracts narrowly lanceolate, acuminate, 2–10 mm. long, 0.7–2 mm. wide, puberulent, calyx campanulate-tubular, 5–7 mm. long, 2.5–3 mm. across, truncate at base, villous-tomentose or subhirsute, the 5 acuminate teeth 1–1.5 mm. long, 1 mm. wide; corolla 16.5–21.5 mm. long, infundibuliform, often tinged with brown or purple, the tube a little contracted below the ovary, 14–18 mm. long, the lobes 2–3.5 mm. long, acute or subacute; stamens 5, 13–17 mm. long, free for 5.5–6 mm., anthers elliptic; ovary subquadrate; style 13–18 mm. long, filiform; fruit black, 8.5 mm. long, 4.5 mm. thick with 3 oblong-elliptic seeds 4–5 mm. long, 2–2.5 mm. broad, about 1 mm. thick.—The flowers fasciculate at the tip of a peduncle

or a lateral branch and subtended by bracts or floral leaves; characters of the flower constant (Francey). Illustrated, Francey, l.c. 7: *pl. 1, fig. 53* (flower); *pl. 2, fig. 13* (calyx).

Piura: Ayavaca, *Soukup 4295.*—Cajamarca: Nanchó, *Raimondi 6646.* Contumaza, *Raimondi 6682.* Prov. Hualgayoc, *Soukup 3885.* —Ancash: Between Samanco and Huaraz, 3,000 meters, *Weberbauer 3160.*—Junín: Tarma, *Raimondi 2461.* To Colombia and Venezuela.

Cestrum undulatum R. & P. Fl. Peruv. 2: 28, *pl. 155.* 1799; 384.

A glabrous shrub developing a granulate erect trunk with terete spreading branches 1–2 mm. thick, the flowering branchlets ordinarily 1–2 dm. long, flexuose, dark purple, obscurely puberulent apically; stipuliform leaves lanceolate, long-acuminate, 2–5 mm. long, scarcely 1 mm. wide; petioles 6–10 mm. long; leaves reflexing, ovate-lanceolate, often unequal at the somewhat rounded decurrent base, acuminate, about 6–9 cm. long, mostly 2.5–4 cm. wide, membranous, undulate, slightly lustrous above, minutely glandular beneath, the 7–10 lateral nerves rather prominent; racemes axillary and terminal, solitary, lax, 5–10 cm. long, 4–8-flowered, the filiform rachis to 7 cm. long, peduncles to 6 mm. long, pedicels 0.5–2 mm. long, articulate, the basal bracts geminate, linear-subulate, deciduous; calyx tubular-poculiform, 3.5–4.5 mm. long, 2.5–3 mm. thick, glabrous or without scarcely puberulent, the 5 or 6 subequal teeth acute or acuminate, marginally ciliate, 2 mm. long, half as wide, nerves slender; corolla lutescent, to 26.5 mm. long; tube contracted below ovary, finally 12 mm. long, apically ampliate, scarcely constricted below the limb, 19 mm. long, entirely glabrous; lobes 7.5 mm. long, acuminate, only marginally pubescent; stamens 19 mm. long, filaments four-fifths adnate, subbifidly denticulate; anthers quadrate; ovary globose-ellipsoid, 8-ovulate, the disk glandular; style 19.5 mm. long, puberulent below the capitate stigma; fruit violet, ovoid-ellipsoid, 2-celled, 8 mm. long, 6 mm. thick; seeds 5 or 6, angled, ovoid-truncate, brownish, 5.5 mm. long, 2.5 mm. broad, 1.2 mm. thick; cotyledons suborbicular.—Sometimes found in gardens, as at Lima by Raimondi, the flowers fragrant. Illustrated, Francey, l.c. 7: *pl. 3, fig. 7* (calyx). F.M. Neg. 18395.

Huánuco: Near Huánuco, *2045; Ruiz & Pavón,* type; *Raimondi.* Ambo, *3161.* Chaulki, *Sawada 74.* Tomaiquichua, *2425.*—Junín: Dos de Mayo, Pichis Trail, *Killip & Smith 25862.*—Loreto: Yuri-

maguas, *Poeppig 23*. La Victoria, *Williams 2589*. Río Mazán, *Schunke 24*. "Yerba hedionda," "yerba sancta."

Cestrum Weberbaueri Francey, Candollea 7: 5. 1936.

Rigidly branched shrub, the branchlets and erectly borne leaves lustrous and glabrous as all parts except the puberulent bracts, calyces only within (teeth marginally tomentulose) and the corolla lobes both sides; leaves acute to acuminate at base but not decurrent, 1– nearly 2 dm. long, 3.5–6 cm. wide or wider, scarcely revolute, the lateral nerves 11–15; stipuliform leaves 1–1.5 cm. long; bracts obovate, about 4 mm. long; flowers green, 21 mm. long, pedicels to 1 mm. long; calyx tubular, 6–6.5 mm. long, the 5 acute teeth 0.7 mm. long; corolla not constricted below limb, the lobes 4 mm. long; stamens equal; stigmas lobate, subexserted.—Otherwise like the related *C. peruvianum* Willd.

Cajamarca: Balsas to Celendín, (*Weberbauer 4254*, type).

19. NICOTIANA L.

Reference: T. H. Goodspeed, The Genus *Nicotiana*, 1–536. 1954 (Taxonomy, T. H. Goodspeed, H. M. Wheeler and P. C. Hutchison, 328–492). Goodspeed and Mildred C. Thompson, Cytotaxonomy of *Nicotiana*, Bot. Rev. 25: 385–415. 1959.

Generally, in Peru, becoming tall subligneous shrubs, sometimes coarse herbs, rarely diminutive annuals, almost always pubescent, often viscid-glandular. Leaves alternate, entire. Flowers pedicelled in terminal panicles with evident central axis, false racemes or these modified into flat pinnate panicles or variously lax or remotely glomerate more or less dichotomous systems, exceptionally flowers foliose bracted. Calyx 5-toothed or -cleft, always persistent, usually somewhat enlarged in fruit. Corolla slightly if at all irregular, often with distinct tube and throat, the limb entire, shallowly 5-lobed or 5-cleft, early contorted-plicate, rarely imbricate. Stamens 5, the free filaments variously inserted, anther dehiscence longitudinal. Ovary 2-celled, the base adnate to a thick annular disk, placental cushions on the central partitions, the many ovules anatropous; style terminal, stigma slightly grooved. Capsule membranous to subligneous, the lower part indehiscent, the upper parting septicidally or very shortly loculicidally, rarely indehiscent. Seeds minute, the single seed coat variously reticulate. Chromosome number chiefly 12 or 24 pairs.—Genus is named for Jean Nicot, French consul

to Portugal in 1560, who sent to France seeds that he obtained from a Dutchman from Florida. The Spaniards are supposed to have first become acquainted with tobacco in the West Indies and its name may have been derived from Tobago or Tabasco, the latter locality in Mexico. Ruiz and Pavón found tobacco cultivated in several provinces, observing the long cigars and the incredibly hard "skeins" or bundles called "tobaco de andullo," which were also offered me.

The work of Dr. Goodspeed exemplifies, as few other accounts of the life history of a group of plants, the effectiveness of modern botanical research when consummated by a student as great in talent as in erudition. The author's secondary title, "Origins, Relationships and Evolution of its Species in the Light of Their Distribution, Morphology and Cytogenetics," indicates the scope of his investigation. In compiling, I hope accurately, the taxonomy as presented by him and senior botanists of the University of California, I acknowledge for all students as well as myself their useful contribution.

The technical key of the monographer and aides is supplemented by a simpler version, this possible because of the relatively few species within Peru.

KEY (after Goodspeed)

Corolla clavate-obconic, throat slightly contracted; stamens included except *N. Benavidesii;* petiole not alate (obsolete, *N. thyrsiflora*); corolla limb entire or nearly, yellow or green (subgenus *Rustica* (Don) Goodspeed).

Corolla 2–5 cm. long, at least twice as long as broad (section *Paniculatae* Goodspeed).

Stems, leaves quite glabrous, glaucous..... *N. glauca.*

Stems, leaves more or less puberulent.

Calyx teeth triangular; corolla yellow-green or limb dark.

Vigorous herbs; stamens included.

Corolla glabrous, entirely yellow-green.... *N. paniculata.*

Corolla sericeous, the limb dark green.... *N. Knightiana.*

Shrubby; stamens exserted..... *N. Benavidesii.*

Calyx teeth minute; corolla pale greenish-yellow. *N. Raimondii.*

Corolla 1–1.5 cm. long, obconic-tubular.

Leaves oblanceolate, petiole not or poorly defined (section *Thyrsiflorae* Goodspeed) ..... *N. thyrsiflora.*

Leaves ovate-elliptic or cordate, petioled (section *Rustica* Goodspeed) ..... *N. rustica, N. Pavonii.*

Corolla salverform to short tubular-salverform, the limb lobed, yellow or sordid greenish-white above (subgenus *Petunioides* (Don) Goodspeed).

Flowers in thyrsoid panicles, not closing in sunlight.

Large calyx lobe soon convex; corolla limb irregular. *N. undulata.*

Large calyx lobe plane; corolla limb subregular ..... *N. Arentsii.*

Flowers in pseudoracemes or panicles, vespertine. *N. plumbaginifolia.*

Corolla infundibuliform, throat widely expanded; stamens somewhat exserted; petiole alate (except *N. glutinosa*) or obsolete (subgenus *Tabacum* (Don) Goodspeed).

Corolla curved, throat expansion broad as long; subarborescent (section *Tomentosae* Goodspeed).

Flowers thyrsoid paniculate; leaves ovate to lanceolate.

Style, stamens well-exserted, ascending ..... *N. tomentosa.*

Style, stamens declined, little exserted ..... *N. Setchellii.*

Flowers pseudoracemose; leaves cordate ..... *N. glutinosa.*

Corolla straight or nearly, throat longer than broad; herbaceous (section *Genuinae* Goodspeed) ..... *N. tabacum.*

SUPPLEMENTAL KEY

Corolla curved, throat expansion broad as long, cupuliform; petioles alate (except *N. glutinosa*).

Inflorescence racemiform; leaves cordate ..... *N. glutinosa.*

Inflorescence paniculate; leaves usually attenuate toward often auriculate or alate base.

Stamens well-exserted, ascending; petioles, unless uppermost, defined, narrowly alate ..... *N. tomentosa.*

Stamens subincluded, declined; leaves sessile or short, petioles broadly alate ..... *N. Setchellii.*

Corolla straight or nearly, not long-tubular, throat longer than broad, or poorly defined (see contrast 3).

Petioles obscure to alate or (and) auriculate; corolla 1–3 cm. long or longer.

Petioles alate, defined; corolla about 3 cm. long or longer.

Flowers paniculate, throat defined.....*N. tabacum.*

Flowers often in racemiform group, throat poorly defined. *N. plumbaginifolia.*

Petioles obscure; corolla about 1.5–2 cm. long..*N. thyrsiflora.*

Petioles well-defined, not alate or auriculate.

Corolla clearly lobed; calyx teeth broad, subobtuse.

Large calyx lobe soon convex; corolla limb uneven. *N. undulata.*

Large calyx lobe plane; corolla limb subregular...*N. Arentsii.*

Corolla obscurely lobed; calyx teeth acute.

Calyx about half as thick as long; capsule 7–12 mm. long, valves widely separating.....*N. Pavonii.*

Calyx more than half as thick as long; capsule 13–16 mm. long, indehiscent or valves little parted.....*N. rustica.*

Corolla at least twice longer than thick, easily defined as long-tubular.

Stems, leaves more or less puberulent.

Corolla 2–3.5 cm. long; stamens included; leaves if cordate with open sinus.

Corolla sericeous, 2–2.5 cm. long to dark green limb. *N. Knightiana.*

Corolla glabrous or nearly, entirely greenish-yellow.

Inflorescence rather open, subviscid; fruiting pedicels nearly straight.....*N. paniculata.*

Inflorescence often dense, subcolumnar; fruiting pedicels often arcuate-uncate.....*N. Raimondii.*

Corolla 4–5 cm. long; stamens exserted; leaves cordate, sinus often closed.....*N. Benavidesii.*

Stems, leaves glabrous, glaucous.....*N. glauca.*

Nicotiana Arentsii Goodsp. in Proc. Calif. Acad. Sci. ser. 4, 25: 297, *pls. 26, 27.* 1944; 379.

A stout annual or short-lived perennial resembling *N. undulata* with erect axis and several rigid ascending branches, the stem early

often reddish-purple with conspicuous weak short silvery trichomes, glabrate in age, thinly corky, ligneous within; leaves spreading, pilose to obscurely pubescent, rotund-ovate or subcordate, acute or acuminate, 1–2.5 dm. long, the petiole less than half as long; panicles reduced-foliose below, lanceolate bracted above, the well-developed rachis branching, the pedicels 2– to finally 6 mm. long, calyx pubescent, 10–14 mm. long, broadly cylindric or subcampanulate, lobes unequal, broadly triangular-ovate, shorter than tube; corolla to limb 16–20 mm. long, slightly asymmetric, tube proper at most 4 or 5 mm. long, 3 mm. wide, throat about 3 times as long, 2.5 times as wide, broadly obconic-clavate, pale greenish-yellow, shortly white pilose, the limb 5–9 mm. wide, dingy straw-colored, pubescent without, the broad lobes subacute to slightly acuminate; fifth filament sigmoidly curved, less pubescent than the 4 longer; capsule elliptic-ovoid, the large calyx lobe plane or nearly; seeds broadly elliptic, 0.6–0.8 mm. long, dark brown; chromosome number 24 pairs.—Otherwise much like the related species *N. wigandioides* Koch & Fintelmann (corolla barely 8–25 mm. wide), 381, of Bolivia; it gives morphological and cytological evidence of being a natural occurring amphiploid involving *N. undulata* and *N. wigandioides;* it is distinguishable from *N. undulata* by the larger rotund ovate leaves, larger flowers, green nerve, corolla limb and large plane rather than boat-shaped calyx lobe in flower and fruit, and from *N. wigandioides* by smaller leaves, smaller flowers and markedly uneven calyx teeth; honors George Arents, who made a noteworthy commentary on the literature and culture dealing with tobacco (Goodspeed). Illustrated, Goodspeed, l.c. 380, *fig. 76.*

Puno: Limbani, *Vargas 1322; 9666,* type; *Metcalf 30529.* Bolivia.

Nicotiana Benavidesii Goodsp. Univ. Calif. Publ. Bot. 18: 137, *pls. 9, 10, 12a.* 1938; 345.

Sparsely branched, subligneous, 2–3 meters high, the stout stem to 3 cm. across, densely puberulent and moderately viscid as the leaves beneath and sometimes the calyx; leaves 1–3 dm. long, twice as long as the petiole, apex retuse, cordate, with basal lobes prolonged inward and often upturned, the upper surface puberulent; panicles columnar, the pedicels 7–8 mm., in fruit 7–9 mm. long; calyx poculiform, densely puberulent, membranes obsolete or obscurely connecting the short broad equal teeth; corolla 4–4.5 cm. long to limb, glabrous or nearly, light greenish-yellow, the tube 5–7 mm. long, 5 or 6 mm. broad, the throat 5–7 times as long, 8–12 mm. wide,

clavate-cylindric but with a short slight dilation just below the somewhat contracted mouth, the limb about 4 mm. wide with obscure apiculate lobes; stamens commonly of 3 lengths, exserted, abruptly and densely lanuginose near slight insertion bend at base of corolla throat; capsule rotund-ovoid, acute, exserted, 9–15 mm. long, slightly ligneous; seeds broadly suboblong or irregularly angular, 0.6 mm. long, dull brown, reticulate; embryo straight, chromosome number 12 pairs.—Named for General O. R. Benavides, a former president of the Republic of Peru, who gave assistance to the Goodspeed Expedition of 1935–1936. In Berkeley, California, the plant does not flower until the second year. Illustrated, Goodspeed, 344, *pl. 62.*

Apurímac: Near Pachachaca Bridge toward Abancay, *West 3979*, type.—Cuzco: Río Limatambo near Río Apurímac, *West 3848*. Prov. Anta, *Vargas 328*. Río Paucartambo, north of Abancay, *Goodspeed Exped. 10548.*

Nicotiana glauca Graham, Edinb. New Phil. Journ. 5: 175. 1828; 335.

Glabrous or the greenish-yellow flowers minutely pubescent, laxly often virgately branched ligneous shrub or short-lived tree several meters high, the younger parts characteristically glaucous, greenish or blue-purplish, reddish-brown as cork begins to form, finally gray; leaves about twice as long as petioles, those on younger shoots sometimes as broad as long, 2.5 dm. or more, flexible, cordate-ovate, elliptic or lanceolate, 0.5–2.5 dm. long; panicles short, glabrous to puberulent, flat, lower branches elongating, the pedicels 3–10 mm. long, later thickened-hamate, 7–12 mm. long; calyx 1–1.5 cm. long, cylindric, sometimes as corolla minutely pubescent, membranes lacking or nearly, teeth triangular, acute, much shorter than tube; corolla 3–3.5 (2.5–4.5) cm. long to limb, the tube itself 5–8 mm. long, about 3 mm. wide, the throat 3–6 times as long, cylindric to clavate, at most 6–8 mm. across, commonly yellow, the limb 3–4 mm. wide, subcircular-subpentagonal, greenish or yellow; stamens subequal, extending almost to mouth, the glabrous filaments geniculate just above insertion on base of corolla throat; capsule broadly elliptic, 7–15 mm. long, included; seeds longer than broad, truncately angular, laterally compressed, about 0.5 mm. long, brown, foveolate-reticulate; embryo straight; chromosome number 12 pairs.—Presumably originated in Argentina, its present wide range now due in considerable part to introduction; narrow-leafed forms occur in

southern Peru and Bolivia; in California specimens have been known to live, as trees, for over ten years (Goodspeed). Raimondi thought it was introduced into Peru about 1865 via Bolivia. According to Herrera it is a very strong narcotic. Illustrated, Bot. Mag. 55. *pl. 2837;* Goodspeed, l.c. 334, *pl. 59;* Addisonia 23: *pl. 739.*

Cuzco: Urcos, *Soukup 14.* Vilcanota, *Pennell 14187.* Huambutio, *West 6495.* Prov. Quispicanchis, *Herrera 685.*—Moquehua: Near Moquehua, *Weberbauer 7453.* Argentina, perhaps Bolivia; now widely distributed in warm temperate climates. "Ccjamata," "supaiccarco" (Herrera).

Nicotiana glutinosa L. Sp. Pl. 1: 181. 1753; 369.

Coarse annual ordinarily a meter or two high with a rather sturdy stem, rigid narrowly divergent branches and a viscid pubescence extending even to the corolla; petioles shorter than the leaves themselves, these in general cordate-rounded, the more or less acuminate tip twisted, the basal lobes often incurved, the larger 1–2 dm. long; racemiform inflorescence elongating, stout, the pedicels 5–12 mm. long, little longer in fruit; calyx campanulate, 5–7 mm. long, the lobes markedly unequal, 1–3 times as long as the tube, triangular, narrowly acuminate, often recurving; corolla tube about 3–5 mm. long, 5 mm. wide, the throat light greenish-yellow or red-tinted, the cylinder 5–10 mm. long, the cup oblique, 1.5–2 cm. long, nearly as broad, bell-like below the limb, this 8–12 mm. wide, pink, red or lemon-yellow within, waxen, glabrous but viscid puberulent without, the lobes usually broadly ovate with shortly acuminate recurved grooved tips, now and then short, even truncate; stamens all tardily exserted from throat or one shorter, the filaments sparsely lanate on lower half, oriented with style above the basal insertion, against upper side of flower; capsule broadly ovoid, 1–1.5 cm. long, included or nearly; seeds 0.6 mm. long, dark brown, reticulate, the ridges unevenly wavy; embryo straight; chromosome number 12 pairs.—According to Comes, *N. glutinosa* was first discovered by Feuillée in the Lima Valley and seeds were sent to Paris by the younger Jussieu; cultivated plants from seeds received from Lima had pink flowers with long, recurved calyx lobes and long, broad ovate corolla lobes; variations in other races include more strict plants, flat panicles, pendent flowers, shorter calyces with erect segments, shorter corolla throat and corolla lobes as well as color ranging from yellows to purplish-reds; plants grown from the Haught collection had lemon-yellow corollas and more triangular leaves while *Metcalf 30782* varied

considerably in habit, leaf shape, orientation of pedicels and flowers, the latter varying also in size, shape and color; the floral variation tends to parallel that in *N. tomentosa* R. & P. and related species (Goodspeed). Characteristically occurs in semi-arid regions of the lower Andean slopes but has been collected to 2,700 meters, probably as a weed. Illustrated, Goodspeed, l.c. 370, *pl. 73.*

Piura: Cerros de Amotape, *Haught 85.*—Amazonas: Balsas, *Metcalf 30782.*—Ancash: Los Zorros, *Goodspeed Exped. 9193.*—Lima: Huacho, *Weberbauer.* Matucana, *258.* Río Chillón, *Pennell 14457.* Near Lima, *Soukup 3806; Weberbauer.* Canta, *Soukup 2827.*—Huancavelica: Pampas to Salcabamba, *Stork & Horton 10258.* Ancco, *Soukup 4028.*—Apurímac: Cunyac Bridge near Abancay, *Vargas 334; 9625.* Ecuador.

Nicotiana Knightiana Goodsp. Univ. Calif. Publ. Bot. 18: 139, *pls. 11, 12b.* 1938; 340.

Similar and related to *N. paniculata* but perennial in tendency, becoming subligneous and with shorter broad-throated bicolored corolla; panicles longer than broad, the pedicels 3–4 mm., in fruit 5–8 mm. long; calyx cylindric, narrowed to base, the membranes often long, narrow-wedged, the short teeth broadly triangular; corolla pale yellow-green cinereous with short sericeous trichomes, the limb dark green, velvety, faintly notched into 5 subtruncate often mucronulate lobes; filaments slightly curved; capsule broadly ovoid, 6–10 mm. long.—The name honors the late Lora J. Knight, who gave support to the first two South American expeditions of the University Botanical Garden (California).

Arequipa: Nazca to Chala, *Metcalf 30336.* Atiquipa, *Worth & Morrison 15673.* Southeast of Chala, *Worth & Morrison 15696.* Near Mollendo, *Mexia 04161,* type.

Nicotiana paniculata L. Sp. Pl. 1: 180. 1753; 339.

A coarse foliose bushy annual (now and then persisting for more than a year), rarely 3 meters tall, with many vigorous erect or spreading branches equaling or exceeding the original axis; stem toward base, as petioles and leaves beneath, pulverulent-puberulent, above viscid pubescent especially in inflorescence; leaves, with petiole, about 1–1.5 (3) dm. long, ovate to cordate; panicles long, the central axis slender, the pedicels 2–5 mm., in fruit 5–10 mm. long; calyx narrowly cylindric, 6–10 mm. long, the membranes obscure, narrow, often elongate, the cuneate teeth shorter than the tube; corolla yellowish-green,

glabrous or nearly, 2–3 cm. long to limb, the tube itself 3–5 mm. long, 2 mm. wide, the throat 3–5 times as long, 1.5–3 times as broad, clavate, the limb 2–3 mm. wide, the lobes frequently apiculate; the stamens subexserted, all or only 4 of filaments slightly geniculate, pubescent at insertion on base of corolla throat; capsule elliptic-ovoid, 8–12 mm. long, usually included; seeds oblong, angular-obovoid or ellipsoid, sometimes compressed, 0.5–0.6 mm. long, blackish-brown, fluted reticulate; embryo straight; chromosome number 12 pairs.—Almost continuously in flower between 300 to 3,100 meters; this was the third species to be noted by a botanist, having been described and figured from Lima by Louis Feuillée in 1714 (J. Observ. Phys. Math. et Bot. 1: 717, *pl. 10.* Paris). The type was grown from seed collected in Peru by Bernard de Jussieu. Illustrated, Goodspeed, l.c. 338, *pl. 60;* Ruiz & Pavón, Fl. Peruv. 2: *pl. 129.*

Cajamarca (fide Goodspeed).—La Libertad: Otuzco, *Gastanadui.* —Lima: (*Nation 162*). Chancay, *Ruiz & Pavón; Wawra 2544; Seler 243.* Pachacamac, *Mexia 8097; 8329.*—Huánuco: Near Huánuco, *Ruiz & Pavón.*—Junín: Palca, *Stork 10984.* Tarma, *1044; Killip & Smith 21927.*—Ayacucho: Puquio, *Metcalf 30292.*—Cuzco: Prov. de Anta, *Herrera 1953.*—Arequipa: Tingo, *Pennell 13124.* Near Mollendo, *West 8207.* Arequipa, *Seler 214; Isern 2012.*—Tacna: South of Tacna, *Metcalf 30351.* "Tobaco Cimarron," "ccama-sayari."

Nicotiana Pavonii Dunal in DC. Prodr. 13, pt. 1: 561. 1852; 355. *N. rustica* L. var. *Pavonii* (Dunal) Goodsp. Nicotiana 355. 1954.

To 12 dm. high, canescent pubescent all over, the prominent main axis with oblique branches from each axil; leaves broadly ovate to elliptic-ovate, the uppermost lanceolate, frequently attenuate to base, obtuse or acute; panicle with many slender many-flowered branches, in well-developed specimens becoming ample; calyx 8–12 mm. long, 3–6 (8) mm. wide, oblong-cylindric, the dorsal tooth (or 2 teeth) elongate, all the teeth acute; corolla to about 17 mm. long, throat 6 mm. wide, limb 3–4 mm. wide; capsule elliptic-ovoid, 7–12 mm. long, 6–10 mm. across, the valves nearly entire, finally separating; seeds 0.7 mm. long, angular; embryo straight or nearly. —Peruvian collections, especially in bud, have calyx, corolla and ovary somewhat purplish; *Metcalf 30800* has calyx 11 mm. long, corolla 22 mm. long, limb 1.5 cm. wide, appearing crenate but the obscure broad lobes actually retuse; plants from seed collected at Huamachuco had corolla 19 mm. long, limb 11 mm. wide, the obscure lobes apiculate (Goodspeed); compare remarks under *N. rus-*

tica. Type localities, fide Dunal, are Chavin, Bombón (Junín) and Chicoplaya (Huánuco). Illustrated, Goodspeed, l.c. 352, *fig. 66* (*N. rustica* var. *Pavonii*). F.M. Neg. 3029.

Cajamarca: Near Cajamarca, *Metcalf 30780*.—Amazonas: Toward Chachapoyas, *Metcalf 30800; Soukup 4172*.—La Libertad: Huamachuco, *West 8084*.—Ancash: Huaraz, (*Stadelman 33*).—Lima: San Mateo, (*Stadelman 7*).—Huánuco: María del Valle, *3566*.—Junín: Tarma, *Stork 10948; 10983*.—Cuzco: Valle del Apurímac, Huará, Paucartambo, *Vargas 331* (det. Standley).—Puno: Cuyocuyo, *Metcalf 30712*. Chile, Bolivia, Ecuador.

Nicotiana plumbaginifolia Viviani, Elench. Pl. Hort. Dinegro 26, *pl. 5*. 1802; 403.

An erect slender annual with tuberculate hispid flexuose soon wiry stem, long basal branches and a few rosulate leaves, these spatulate to obovate or oblanceolate, 1–2 dm. long or longer, hispid; leaves of lower stem as large or larger, rotund-ovate, broadly alate at the clasping to auriculate base, abruptly acuminate, usually twisted, undulate to plicate-erosulate, the upper sessile, auriculate, lanceolate to linear-lanceolate, strongly undulate-plicate; raceme-like inflorescences simple or remotely furcate, occasionally tardily branching, the pedicels 3–7 to finally 5–10 mm. long, flowers vespertine; calyx hispidulous, 8–13 mm. long, the elliptic ovoid tube 10-ribbed, the membranes long, narrow, the segments subulate filiform, subequal, about equaling the tube, erect or slightly spreading; corolla puberulent, the tubular part 2.5–3.5 cm. long, 1.5–2 mm. broad, greenish-ivory or somewhat purplish, the throat poorly defined but finally abruptly swollen to 3 or 4 mm. a few mm. below the somewhat contracted mouth, the limb about 1 cm. wide, deeply lobed, the ovate acute lobes ivory or lavender without, with 5 dark nerves, white or lavender within; anthers dark purple, 4 subsessile, 2 or 3 mm. below mouth, sometimes didymous, the fifth about 3 mm. lower, its filament 1 mm. long; capsule narrowly ovoid, 8–11 mm. long, usually included; seeds 0.5 mm. long, rotund elliptic, light brown, wavy-reticulate; embryo straight; chromosome number 10 pairs.

San Martín: Tarapoto, *Spruce 4169*. Adjacent Ecuador; northwestern Argentina to southeastern Brazil; Mexico and Caribbean, common, perhaps introduced.

Nicotiana Raimondii Macbr. Field Mus. Bot. 8: 106. 1930; 349.

Semi-ligneous (the thin reddish cork tardily forming), a meter or two high with several to many erect whitish-green slender stems from

a root-crown, dull velvety-puberulent as the petioles, leaf blades beneath and calyces; leaves ovate or slightly cordate, 1–1.5 dm. long; panicles narrowly columnar, dense, the pedicels 6, finally 7 mm. long; calyx broadly cylindric, 6–7 mm. long, membranes variable, usually broader above, the subequal slightly recurved teeth minute; corolla 2.5–3 cm. long or longer to limb, glabrous, the tube itself about 2 mm. long and wide, the throat 10–14 times as long, to 3 times as broad, clavate, pale greenish-yellow, the paler limb 2–3 mm. wide, recurved with obscure shallow apiculate lobes; stamens subexserted, filaments densely lanate to 8 mm. above insertion at base of throat where straight; capsule dark brown, ellipsoid, 8–10 mm. long, slightly exserted; seeds angular-obovoid or suboblong, somewhat compressed, 0.6 mm. long, brown, fluted reticulate; chromosome number 12 pairs. —Inflorescences rather lax to subglomerate; after anthesis many pedicels become hamate by basal curving; withered and darkened corolla may persist briefly (Goodspeed). Illustrated, Goodspeed, l.c., 348, *fig. 64.*

Cuzco: Urubamba Valley, *Herrera 1540,* type; (*Stadelman 22*); *Soukup 16.* Huambutio, *West 6496.* Ollantaitambo, *Pennell 13665; Herrera 233.*

Nicotiana rustica L. Sp. Pl. 1: 180. 1753; 351.

Robust, the solitary or sometimes several erect stems moist-viscid pubescent, the indument merely a puberulence on the fleshy leaves, these ovate to elliptic-lanceolate, sometimes cordate or subrotund, often unequal at base, 1–1.5 dm. long or longer, the petiole much shorter than the blade; panicles various but the central axis distinct, the pedicels 3–4, later 5–7 mm. long; calyx 8–15 mm. long, poculiform to cylindric, pubescent, the membranes narrow, one of the broad acute teeth much longer; corolla greenish-yellow, 12–17 mm. to limb, puberulent, the tube commonly 3 mm. long, 2 mm. wide, the throat about 3 times as long, 6–8 mm. wide, broadly obconic, slightly contracted at mouth, the limb 3–6 mm. wide, obscurely and obtusely lobed; stamens white pilose for about 2 mm. above basal insertion, 4 barely included, sigmoidly erect, the fifth shorter; capsule subellipsoid to subglobose, 7–16 mm. long, included or nearly; seeds 0.7–1.1 mm. long, dusky brown, fluted-reticulate; embryo straight or bent; chromosome number 24 pairs.—After Goodspeed (as of course all other descriptions), who notes that his interpretation represents a composite picture of this highly polymorphic species, long a cultigen and apparently unknown today in the wild state (with

the possible exception of var. *Pavonii* (Dunal) Goodsp. (*N. Pavonii* Dunal), l.c. 355, which his description includes). For the usefulness of this work it seems preferable to retain *N. Pavonii* as a distinct species; otherwise its taxonomic standing is parallel to the formal variants *pumila* Schrank and *brazilia* Schrank; the native *N. Pavonii* is more slender, the filaments are slightly curved and especially the smaller capsules are dehiscent, the valves separating. The description is included here largely to indicate its relationship to *N. Pavonii* and because according to Goodspeed genetic evidence has shown that it is an amphiploid, progenitors of *N. paniculata* and *N. undulata* having entered into its origin, *N. Pavonii* showing affinity to the former in narrower flower, to the latter in traces of purple coloration. Illustrated, Goodspeed, l.c. 354, *pl. 67* (var. *brazilia* Schrank).

N. rustica rather than *N. tabacum* L. was the first tobacco grown and exported by the American colonists but today *N. tabacum* is cultivated commercially as a source of nicotine products (Goodspeed).

Peru (compare note above).

Nicotiana Setchellii Goodsp. Univ. Calif. Publ. Bot. 18: 195, *pls. 14, 15.* 1941; 367.

Soft-woody shrub, 2–5 meters high, the 1–3 stems in age thinly corky, striated by shallow furrows, marked by leaf scars, much branched, green, viscid pubescent as the leaves beneath; leaves shortly decurrent, sessile or with short alate petiole, base somewhat auricled, obscurely pubescent both sides, oblong, oblanceolate or lanceolate-elliptic, 4–8 dm. long; panicle congested, primary branches about 30, mostly simple, the pedicels 10–18, in fruit 15–20 mm. long, directing the flowers centrifugally, the maturing capsules centripetally; calyx 1.5–2.5 cm. long, broadly cylindric or cylindric-campanulate, teeth unequal, narrowly triangular-acuminate, the longest often equaling the tube; corolla viscid or varnished without, the tube 5 mm. long, slightly wider, the throat pale greenish-yellow, sometimes red-tinged, the throat cylinder 1.5–2 cm. long, 7–8 mm. wide, the throat cup twice as broad as the cylinder, 15–18 mm. long, slightly inclined, widely open; limb 12–15 mm. wide, ascending, red tinged with bronze, within pink to red, the lobes shallow to obsolescent with acuminately protracted tips, the entire limb pentagonal; stamens all or nearly all exserted but included in limb, the filaments inserted near the base, then oriented with the style against the lower side of the flower, quite glabrous or below puberulent; capsule elliptic, 1.5–2 cm. long, included; seeds subspherical to somewhat obovoid, about

0.5 mm. long, dull brown, reticulate, the ridges minutely wavy; embryo straight; chromosome number 12 pairs.—Known only from type, found along trail on Beauchamp's second day's journey from Chachapoyas; readily distinguished from *N. tabacum* by its shrubbiness, simple pattern of inflorescence, stamen orientation and bowl-like corolla limb, which with the throat cup forms a bell. After first year (at Berkeley) a single plant increased by root sprouting to twenty or more individuals, some even at a distance of twelve meters. Illustrated, Goodspeed, l.c. 368, *pl. 72.*

The name recognizes the role of the late W. A. Setchell in initiating and contributing to the *Nicotiana* investigations at the University of California.

Amazonas: Between Chachapoyas and Leimabamba, *Beauchamp*, type.

Nicotiana tabacum L. Sp. Pl. 1: 180. 1753; 372.

Stout viscid annual or limited perennial 1–3 meters high, the thick erect stem with few rapidly ascending branches, the decurrent leaves (the larger at least 5 dm. long) ovate-elliptic or lanceolate, attenuate to base or alate-subpetiolate, acuminate; panicle with distinct rachis, the several branches usually compound, commonly shorter than rachis; pedicels 5–10 (15) mm. long, in fruit 10–20 (25) mm.; calyx cylindric to cylindric-campanulate, 12–20 (25) mm. long, viscid, the triangular acuminate teeth shorter than or equaling the tube, unequal; corolla little if at all curved, puberulent, the tube proper (7) 10–15 mm. long, 2.5–3 mm. wide, the throat (23) 25–40 mm. long, the lower half cylindric, 3–5 mm. wide, pale greenish-cream as the upper half or this pink to red, usually abruptly expanded into a deep cup 7–12 mm. wide but occasionally obconic; limb 1–1.5 cm. wide, lobed or pentagonal, white, pink or red; stamens inserted on base of corolla throat, erect, oriented to upper side of flower or evenly spaced, anthers or two longer pairs near mouth slightly exserted, the fifth stamen shorter than either pair; capsule narrowly ellipsoid, ovoid or orbicular, acute or obtuse, exserted or included, 1.5–2 cm. long; seeds spherical or broadly elliptical, about 0.5 mm. long, brown, ridges fluted, embryo straight; chromosome number 24 pairs.—This, of course, is the species in cultivation that is the commercial source of the habit-forming drug nicotine, the use of which doubtless some day will be controlled as in the case of other drugs. Goodspeed, l.c. 373–375, has given an interesting account of the species-origin, variation and relationship which in part reads: there is today no well-

authenticated record of the occurrence of this species in the wild state; presumably it escaped from pre-Columbian as it certainly has from present-day agriculture, particularly in Central and South America; its demonstrable origin in amphiploidy, involving progenitors of a member of section *Tomentosae* and of *N. sylvestris* Speg. & Comes, suggests that its original area of natural distribution was northwestern Argentina and adjacent Bolivia, where *N. otophora* Griseb. is today in contact with the latter or where relatively recently that or other species of section *Tomentosae* had such a contact. Still quoting the monographer, the type (from "America") consists of a lanceolate acuminate leaf 24 cm. long, attenuate into a short alate petiolar region and a young inflorescence with only flowers; calyx 16–17 mm. long, cylindric to campanulate, corolla 4.5 cm. long to limb, throat cylinder 3 mm. wide, abruptly expanded, throat cup 1.5 cm. long, 7 mm. wide; limb lobes elongate, acuminate; major variations involve shrubby habit, leaves sessile, auricled, or with non-alate petioles, inflated orbicular calyces, short broad teeth, slender corollas, gradually expanded throat, pentagonal limb. For synonymy consisting mostly of varieties see Goodspeed, l.c. 372. Illustrated, l.c. 374, *fig. 74*.

Often persisting as an escape from cultivation as the race "Machupicchu" collected near the famous archaeological site above the Río Urubamba, Cuzco; tall in habit, it is strongly suggestive of the Bolivian *N. tomentosiformis* Goodspeed, l.c. 363, in leaf, inflorescence and flower.

Cajamarca: Monte Seco, *Soukup 3890*.—San Martín: Tarapoto, Lamas, San Roque, *Williams 5529; 6456; 7248*.—Huánuco: Llata, *2277*.—Junín: Huancayo, *Soukup 3978*.—Loreto: Río Nanay, *Williams 428; 1287*.—Cuzco: On old terraces, ruins of Machupicchu, *Mexia 8073; 8072*.

Nicotiana thyrsiflora Bitter ex Goodsp. Univ. Calif. Publ. Bot. 18: 138, *pl. 13*. 1938; 349.

Coarse, simple or sparingly branched perennial 1–3 meters high marked by the densely puberulent thick stem terminating in an erect stout columnar panicle with slender suberect laterals; pedicels 8–15 mm. long; calyx 1–1.5 cm. long, deeply campanulate, obscurely pubescent, the membranes short, narrow, the triangular teeth tipped with darker green, the longest less than half the length of the tube, often much less; corolla glabrous, greenish-yellow, 9–15 mm. long to limb, the tube 2–4 mm. long and wide, the throat 3.5 times as

long, 5–7 mm. wide, broadly obconic or inflated-funnelform, contracted at mouth, the limb 3.5 mm. wide, the lobes apiculate; stamens all subexserted, inserted at base of throat, the filaments there sparsely pilose; capsule broadly oval, 1–1.5 cm. long, included; seeds about 1 mm. long, dull sooty brown-black, honeycomb reticulate; embryo straight or nearly; chromosome number 12 pairs.—Its spicate habit suggests *Verbascum thapsus* L.; the corolla limb is a bowl as broad as the corolla is long; it differs from *N. rustica* L. in the crowded narrow sessile leaves, spicate habit, ascendant corolla limb (or this only in part deflecting) and sometimes purple anthers (Goodspeed). Grass-shrub formation, stony slopes, 2,800 to 3,800 meters. Illustrated, Goodspeed, l.c. 350, *fig. 65.*

Cajamarca: Los Tajones Valley, *Stork & Horton 10018.*—La Libertad: Between Huamachuco and Angasmarca, *Weberbauer 7015,* type; *West 8179.* North of Cachicadán, *Stork & Horton 9990.* Santiago de Chuco, *Stork & Horton 9943.*

Nicotiana tomentosa R. & P. Fl. Peruv. 2: 16, *pl. 129, fig. a.* 1799; 357. *Lehmannia tomentosa* (R. & P.) Spreng. Anleit. Kennt. Gew. 2: 458. 1817.

Sometimes arborescent and attaining 7 meters, the ascendant branches forming a crown, the 1–3 stems tardily forming cork, in age laced by leaf scars, usually more or less viscid pubescent including the calyces; leaves decurrent, the short petiole alate, 2–11 dm. long, the uppermost leaves subsessile, typically viscid-tomentose beneath, ovate to elliptic-lanceolate; panicles in type lax, ample, with 10–15 remote rigid branches, the bracts deciduous, the pedicels 10–12 mm., in fruit 15–20 mm. long; calyx about 1.5–2 cm. long, poculiform-campanulate, typically loosely enclosing the corolla throat, the longest of the rather broad acute teeth not exceeding the calyx tube; corolla sparsely and minutely glandular only without, the tube obsolete or nearly, the throat 2–3.5 cm. long, light greenish-yellow, 6 or 7 mm. broad below, narrowed above, one side shorter, the throat cup as long as the cylindrical part, about twice as broad, declinate, widely open, 5–10 mm. wide, usually pink or red and the darker and lighter areas forming a pattern, the lobes in type poorly defined, abruptly acuminate; stamens far-exserted, filaments at base then oriented against upper side of flower, curved, glabrous; style somewhat curved toward apex; capsule broadly ovoid-oblong, 10–18 mm. long in type, included or nearly, subligneous; seeds oval to nearly spherical, about 0.4 mm. long, dark brown, reticulate, the ridges irregularly wavy;

embryo straight; chromosome number 12 pairs.—Limb margin withers with cup. The seed is the smallest in the genus; approaches through var. *Leguiana* (Macbr.) Goodsp. l.c. 361 (*N. Leguiana* in Field Mus. Bot. 8: 105. 1930), *N. tomentosiformis* Goodsp. l.c. 363, of Bolivia, the throat cup of the smaller flower shorter than the cylinder, and *N. otophora* Griseb., of Bolivia and Argentina, unique in withering of limb margin in anthesis (Goodspeed). The variety (named in honor of a former president of Peru) which replaces the typical form in southern Peru and adjacent Bolivia has leaves chalky- or downy-tomentose beneath to obscurely pubescent or nearly glabrous in age; panicles usually compact, branches 12–60, rarely all remote; calyx 1–1.5 cm. long, ordinarily closely investing and shorter than the cylindrical part of the corolla throat, the teeth variable; corolla limb white, pink or red, deeply lobed, the lobes obtuse, acute or acuminate; capsules at least half exserted. It seems to be a consistently and reasonably well-established species occupying its own geographic area in spite of its obviously close relationship to the three plants already mentioned.

"*N. colossea* Andre" appears to be the most widely distributed garden representative of the polymorphic variety. It is spontaneous in gardens in Arequipa and cultivated in warmer botanical gardens everywhere; Goodspeed, l.c. 363, has given a detailed description of this horticultural race. All collections are the variety except those from Huánuco. Illustrated, Goodspeed, l.c. 358, *fig. 68;* 360, *fig. 69* (var.); Bot. Mag. 118, *pl. 7252* ("*N. colossea*" as *N. tomentosa*). F.M. Neg. 18237.

Huánuco: Near Chinchao, *Mexia 04144.* María del Valle, *3548.* Muña, *3990; Ruiz & Pavón,* type. Acomayo, *Mexia 04110.* Huamincha, *Woytkowski 34221.* Puente Durand, *Stork & Horton 9879.*—Junín: La Merced, *Killip & Smith 24070* (distr. as *N. Rusbyi*). Tarma to Carpapata, *Stork 10964; Soukup 3964.*—Huancavelica: Salcabamba, *Stork & Horton 10281.*—Ayacucho: Aína, *Killip & Smith 23118.*—Apurímac: Talavera, *West 3736.* Prov. Abancay, *Goodspeed Exped. 10579.*—Cuzco: Machupicchu, *Herrera 3213; Goodspeed 4527.* Valle de Santa Ana, *Herrera 3616.* Ollantaitambo, *Pennell 13638.* Paucartambo, *Vargas 332; 333.* Chuyani, *Vargas 9744.* Towards Pillahuata, *West 7104.* Yacay, *Soukup 769.* Medias Mayo, *Vargas 11160.* Cedrobamba to Maquina, Valle de San Miguel, *Herrera 1991* (type, *N. Leguiana*).—Puno: Near Sandía, *Metcalf 30716.* Bolivia.

Nicotiana undulata R. & P. Fl. Peruv. 2: 16, *pl. 130, fig. b.* 1799; 377. *N. breviflora* Poir. Suppl. Lam. Encycl. Meth. 4: 94. 1816. *N. undulata* var. *angustifolia* Comes, Monogr. Nicot. 30. 1899.

Somewhat fleshy annual, to 2 meters high, the rather stout more or less ridged velvety canescent stem often viscid above, the many branches more slender; radical leaves rosulate, elliptic to lanceolate, 2–8 (18) cm. long, puberulent, the lowest petioles one-half as long, progressively shorter to obsolete above, the upper leaves broadly ovate or ovate-elliptic to lanceolate, sometimes cordate, usually obtuse, ribbed and commonly corrugated, 8–20 (30) cm. long; panicle axis and branches racemosely extended, the pedicels 1–3 mm., finally 2–6 mm. long; calyx nearly as long as corolla, frequently viscid, the tube cupulate, membranes scant, teeth broad, obtuse or subacute, one long and convex, the rest very short; corolla sordidly greenish-yellow, usually with a blue-purple tinge, the tube proper 2–3 mm. long and broad, the throat 3 times as long, 1.5–2 times as broad, obconic-cylindric, clavate, pubescent, the limb 2–6 mm. wide, reflexed, irregular, the short broad lobes acute; 4 stamens barely included, the filaments subgeniculate near insertion at base of throat where spreading pilose, the shorter fifth filament glabrous or nearly, arcuate; capsule broadly oval, 5–10 mm. long, included, the large calyx segment galeate; seeds oblong or suboblong, about 0.8 mm. long, nearly black, fluted reticulate, embryo straight; chromosome number 12 pairs.—*N. undulata* is a polymorphic species; apparently, a tall (averaging 1 meter) pyramidal form with larger corolla, limb 4–6 mm. wide, is common from the Cuzco region to near Cajamarca, while southward from Lake Titicaca the average height approaches 5 dm. Habit is commonly a clump of stems, corolla tube is 2–3 mm. wide and inflorescence is simpler; the species bridges subgenus *Petunioides* (as evidenced by the acute lobe, irregular greenish-white corolla limb) and subgenus *Rustica* as shown in habit, in leaf-type and in the velvety canescent stem (Goodspeed). Occurs in cold dry lower puna, 2,700 to 4,200 meters. Illustrated, Goodspeed, l.c. *fig. 75.* F.M. Negs. 18236; 18391.

Cajamarca: Toward Celendín, *Metcalf 30781.*—Lima: Chicla, (*Ball*). Viso, *584.*—Junín: Pampa, Bombón, *Ruiz & Pavón*, type. La Oroya, *Stork 10445.*—Huancavelica: Near Huancavelica, *Weberbauer; Soukup 2773.*—Ayacucho: Puquio to Lucanas, *Metcalf 30328.* —Cuzco: Pisac, *West 7173.* Near Cuzco, *Soukup 17; 18.* San Andres, *Vargas 9843.*—Puno: Granja Salcedo, *Vargas 9627; Soukup 902.*

Near Puno, *Soukup 632*.—Tacna: Candarave, *Weberbauer 7375*. To northwestern Argentina.

20. FABIANA R. & P.

In Peru a viscid-resinous compactly and fasciculately branched shrub with almost minute somewhat imbricate leaves. Peduncles solitary, the single tubular-funnelform flower 5-merous. Corolla tube more or less ampliate, the plicate limb shortly lobed. Stamens equal, included, the anthers longitudinally dehiscent. Stigma bilamellate. Disk if present fleshy. Capsule included, 2-valved, apically bifid.

Fabiana densa Remy, Ann. Sci. Nat. ser. 3, 8: 227. 1847; 589.

Bark rugose, the erect branches rather slender, somewhat flexuose, puberulent; leaves many, alternate, sessile, narrowly linear, slightly incrassate apically, 2–3 mm. long, scarcely 0.3 mm. wide; pedicels axillary, shorter than leaves, cylindric, glandular; calyx tubular-campanulate, segments lanceolate-linear, obtuse, granulose-viscid-puberulent as the violet-green corolla, this three times longer, narrowed medially, throat inflated, oval lobes subacutely narrowed; disk biparted, orange; style longer than stamens, inflated stigma simple; capsule ovoid.—The Peruvian shrub is var. *ramulosa* Wedd. Chloris And. 2: 95, *pl. 57*. 1857, type a meter tall, the yellowish-brown flowers about 1 cm. long.

Tacna: Tacora, (*Weddell*, type, var.). Candarave, *Weberbauer 7363; 7363a*. Tijaca, *Raimondi*. Bolivia.

21. NIEREMBERGIA R. & P.

Reference: R. Millán, Darwiniana 5: 487–547. 1941.

Herbs or ligneous below, the Peruvian species with filiform repent stems, short ascending-erect branches. Flowers subsessile, solitary, extra-axillary or opposite the entire leaves, the corolla tube slender, elongate. Capsule valves deeply bifid.—Otherwise like *Fabiana* R. & P., the ovary stiped. Juan Eusebio Nieremberg was a Spanish naturalist (1595–1658).

Nierembergia repens R. & P. Fl. Peruv. 2: 13, *pl. 123, fig. c.* 1799; 498. *N. spathulata* HBK. Nov. Gen. & Sp. 3: 8. 1818, fide Millán; cf. below.

Branches and younger solitary or subgeminate leaves slightly puberulent; leaves elliptic-subspathulate, rounded or obtuse at apex, narrowed to petiole, 1-nerved, glabrous in age; calyx tubular, pilose below, the lanceolate segments acute; corolla white or lilac, glabrous, the slender tube 4 times longer; limb abruptly dilated, subcampanulate, plicately 5-lobed, the rounded lobes equal; capsule rounded-ovoid.—The presumably Peruvian plant is var. *pilosella* Dunal in DC. Prodr. 13, pt. 1: 583, 1852, petioles margined, 6–30 mm. long, leaves smaller, subapiculate, 8–18 mm. long, 4–5 mm. wide, pilosulous; corolla tube 2.5–3 cm. long, abruptly dilated into the campanulate limb; seeds oblong, subangled, brownish. Corolla tube 3–6 cm. long, limb 2.5 cm. wide (Millán). Millán has reasoned that it is an error to accept *Nicotiana minina* Molina, Sag. Nat. Chile 153. 1782, as the earliest name for this plant as proposed by Johnston, Contr. Gray Herb. 70: 92. 1924; the plant of Molina is included without question by Goodspeed in his list of insufficiently known species of *Nicotiana*. However this may be, the occurrence of the plant in Peru is to be verified, as apparently there is only the one doubtful record. Likewise, the viscid *N. petunioides* Dunal, l.c. 506, with subfiliform tube gradually dilated to the limb, is even more doubtfully Peruvian, but in all probability it was collected in Chile and may indeed be a species of *Petunia*. Possibly occurring is *N. boliviana* Millán, l.c. 537, *pl. 18A*, from adjacent Bolivia, an ascending (scandent?) plant with viscid sublinear leaves and calyx lobes, glabrous corolla tube 8 mm. long, limb small; it may be *Ule 9762* from Río Acre, Brazil, given an herbarium name by Bitter in reference to its habit. Francey, in Diels' Contr. Flora Ecuador, Biblioteca Botanica 288. 1938, observed that the leaves and flowers of Ecuadorean specimens representing species of HBK. are only a third to a half as large as those of *N. repens*, ex char. Illustrated, Millán, l.c. *pl. 1*. F.M. Neg. 540.

Peru(?): Without locality, *Dombey* (*Ruiz & Pavón*). Ecuador? Colombia? Chile.

22. SALPIGLOSSIS R. & P.

Leptoglossis Benth. Voy. Sulph. 143. 1844. *Leptofeddea* Diels, Repert. Sp. Nov. 16: 193. 1919.

Slender-stemmed viscid-pubescent or nearly glabrous annuals or half-shrubs with more or less evanescently subrosulate basal leaves, the upper peduncled or sessile, narrow, entire (Peru). Flowers tubular, with 5-lobed somewhat bilabiate spreading limb. Corolla often

net-veined. Fertile stamens 4 or 2 (*Leptofeddea*) or two reduced in size (*Leptoglossis*); no botanical name is needed to honor the owner of the useful serial in which Diels published his segregate "marked by the contrasting basal and stem leaves."

The popular garden flower *S. sinuata* R. & P. of Chile may persist; it is known by the generic name; its almost infinite variations in color and corolla lobing have been studied cytologically as by Dale, Amer. Journ. Bot. 24: 651–656. 1937, and by Dale and Rees-Leonard, Genetics 24: 356–367. 1939, who, curiously, did not investigate the species.

Fertile stamens 4 (2 sometimes smaller); calyx glabrous.

Corolla colored; calyx straight.....*S. acutiloba.*

Corolla white with yellow center; calyx curved.....*S. albiflora.*

Fertile stamens 2; calyx puberulent or viscid.

Evanescent annual; calyx puberulent.....*S. lomana.*

Persisting but flowering as an annual; calyx viscid.
S. schwenkioides.

Salpiglossis acutiloba Johnst. Contr. Gray Herb. 85: 179. 1929. *S. linearis* Johnst. l.c. 81: 96. 1928, not Hook.

Annual to 3 dm. high, inconspicuously glandular-villous at base and on corollas without; rosulate basal leaves oblanceolate, 2–3 cm. long, the cauline linear, 2–6 cm. long, 1–1.5 mm. wide, all entire; flowers at branchlet tips in an irregular cyme; calyx 4–7 mm. long, to 10 mm. long in fruit, the upper lobes longer; corolla tube orange-yellow or greenish, more or less brown- or purple-veined, especially the lobes, 17–20 mm. long, the tube 11–15 mm. long, to 0.5 mm. wide at base, 2 mm. wide above, the lower lip lobes oblong-lanceolate, bilobulate, to 2.5 mm. long, the upper 3 lobulate, the lobes narrowly ovate, 2 mm. reflexed, 2 mm. long; 2 upper anthers perfect, filaments villous toward base, lowest stamen (in type) also fertile but reduced, stigma entire; capsule ellipsoid, to 4 mm. long, seeds angulate.—Section *Leptoglossis* Wettstein, Pflanzenfam. 4, Abt. 3b: 36. 1891, but corolla tube abruptly contracted along the base; the fifth stamen may be present or absent in most species, as it probably is here (author).

Arequipa: Tiabaya, *Pennell 13081; 13063,* type. Tingo, *Pennell 13119.* Yura, *Vargas 7984.*—Moquehua: Hills southeast of Moquehua, *Weberbauer 7456* (det. Johnston).

Salpiglossis albiflora Johnst. Contr. Gray Herb. 85: 178. 1929.

Similar to the preceding species but differs in lobes of white corolla semiorbicular or broadly ovate, 2–3 mm. broad, ascending, calyx somewhat curved, costate, shorter, and stigma emarginate, bilobed. —The corolla is white with yellow eye; the stigma resembles that of *S. schwenkioides* (author).

Ancash: Pampa Romas, *Weberbauer 3178.*—Lima: Matucana, *375* (det. Johnston). Near Chosica, *Weberbauer 5325.* San Bartolomé, *Weberbauer 5297* (det. Johnston).—Moquehua: Mt. Estuquina, *Weberbauer 7424a*, type. Between Moquehua and Torata, *Weberbauer 7424.*—Ayacucho: Near Nazca, *Ferreyra 5465* (det. Cowan). —Ica: Huaytara, *Weberbauer 5400.*

Salpiglossis lomana (Diels) Macbr., comb. nov. *Leptofeddea lomana* Diels, Repert. Sp. Nov. 16: 193. 1919.

Type to about 1 dm. tall, simple; basal leaves (petioles 2–5 mm. long) more or less suborbicular, 3–8 mm. across, veinless, the stem leaves near or with the cyme, linear-oblanceolate, to 12 mm. long, 1.5–2.5 mm. wide; cymes pubescent; calyx tube 4 mm. long, 3.5 mm. wide, linear lobes 3 mm. long, 1 mm. wide; corolla lurid yellow or cream-colored (Mexia), the tube about 1.5 cm. long, 4–5 mm. broad, the lobes 2.5–3 mm. long; stamens 7–8 mm. long, staminodia 4 mm. long; ovary 3 mm. long; style much dilated at apex, emarginate.— The type a slender annual, the leaves mostly subrosulate near the base. F.M. Neg. 3064.

Arequipa: Mollendo lomas, *Weberbauer 1486*, type; *Günther 12246* (det. Morton). *Mexia 7776* (det. Johnston); *04176.*

Salpiglossis schwenkioides (Benth.) Wettst. Pflanzenfam. 4, Abt. 3b: 36. 1891. *Leptoglossis schwenkioides* Benth. Voy. Sulph. 143. 1844.

Persisting as a perennial, ligneous below, herbaceous and, especially above, viscid-pubescent, branching; leaves sessile, lanceolate or linear-lanceolate, acuminate, 1–1.5 cm. long or longer; flowers crowded at branchlet tips, variously cymose; calyx 3 to (in fruit) about 5 mm. long; corolla tube 15–18 mm. long, limb 6–8 mm. across, fertile stamens 4, included; style apically dilated, lobes orbicular; capsules membranous, valves finally bifid; seeds many, subangulate.

La Libertad: Above Trujillo, 1,000 meters, *López M. 0739.*—Ancash: (*Weberbauer*, 167).—Lima: Toward Huaral, south base of Hua-

choc Pass, 1,000 meters, *Hutchison 1032*. Huamantango, (*Barclay*, type). Sta. Eulalia, 1,200 meters, *Goodspeed 33098*. San Bartolomé, *Weberbauer 5290*. Without locality, (*Mathews 1011; Cumings 1010*). Near Canta, *Ferreyra 7255* (det. Cowan).

23. SCHWENKIA L.

Erect or scandent herbs or somewhat ligneous with alternate entire leaves and racemose-paniculate long-tubular yellowish-green flowers in the upper axils. Corolla limb erect, plicate or 5-denticulate, the minute or setaceous teeth often expanded into laciniform entire or bifid appendages. Fertile stamens 2–4, anthers 2-celled, coherent. Style subexserted, stigma entire. Disk cupulate or sometimes obsolete.—The almost filiform corolla base of the only species in Peru distinguishes it handily from *Salpiglossis* and *Browallia;* otherwise, the induplicate scarcely imbricate aestivation has been accepted as its chief character.

Schwenkia grandiflora Benth. in DC. Prodr. 10: 193. 1846.

Becoming scandent and suffruticose toward base, branches terete, finely striate and pilosulous as the petioles (6–10 mm. long) and leaf-nerves beneath; leaves suboblong, membranous, to 6 cm. long or longer, 3.5 cm. wide, acuminate, the uppermost much reduced; panicles ample, lax, the bracts minute; pedicels filiform, scarcely as long as calyx, this campanulate, about 3–4 mm. long, teeth linear, acuminate, 1.5 mm. long; corolla 2.5–3 cm. long, tube little ampliate to limb, setosely denticulate and with much longer acuminate appendages; anthers 2, visible, reaching to tip of corolla lobes, style slightly exserted; filaments pubescent; capsule papillose-punctate, valves membranous; seeds few, striate, rugulose.—Flowers clear green (Schunke); yellow (Klug).

Loreto: Río Mazán, *José Schunke 24*. Near Iquitos, *Klug 751*. To British Guiana.

24. BROWALLIA L.

Reference: Bentham in DC. Prodr. 10: 197–198. 1846.

Slender glabrous or viscid-pubescent annuals (or rarely perennials) with thin entire alternate or subopposite leaves and salverform solitary or racemose flowers. Calyx (in flower) narrowly to broadly campanulate. Corolla limb oblique, slightly bilabiate, aestivation

imbricate. Perfect stamens 4, filaments ciliate to lanate, unequal. Style sublobulate.—Frequently grows in cultivated lands and along trails, the yellow-eyed blue, violet or white flowers attractive. The Chilean *Schizanthus pinnatus* R. & P., with pinnate or bipinnate leaves and purple-blotched white or lavender flowers with cleft or laciniate lobes, may persist from cultivation, which probably was the origin of the collection by Woitschach from Tacna.

John Browall was Bishop of Abo (Sweden) in 1743; originally an intimate friend of Linnaeus, the latter, according to Hooker, Bot. Mag. 58: 3069. 1831, immortalized their subsequent disagreement by naming the three known species *B. elata* L., this to express the degree of their union, *B. demissa* L., its cessation, and *B. alienata* L. (*Ruellia* species); while these names intimate the uncertain characters of the plant, they also imply the friends' differences; botanists have often made known their disappointment in each other, as Ruiz and Pavón and any number of our time, but rarely if ever so subtly!

It seems to me there is no clear concomitance of morphological characters used to define species and therefore their genetic status is questionable, in turn their taxonomic significance; the expediency of my key will be apparent in the sorting of any considerable number of collections; it may be useful to remark that as in so many annuals with weedy tendencies, early and later vegetative developments may differ greatly (one or more species surely persist as semi-ligneous plants) and apparently size of flowers as well as luxuriance of entire plant may depend at least partly on environment; sometimes corollas considerably smaller may be among the last produced and there seems to be a glandular and eglandular phase for at least some species, as the character itself is variable. Obviously my scepticism of the species is great—it may be too great.

[Mr. Macbride's scepticism is perhaps amply justified. We note that Mr. Langhammer, who has a revision of *Browallia* in preparation, has annotated most of our Peruvian specimens of the genus as *Browallia americana* L. (with two subspecific designations). If Mr. Langhammer is justified in making the reductions which his annotations on our specimens would indicate, the Browallias of Peru should be reduced to two species: *B. americana* (with two subspecies) and *B. speciosa.*

Mr. Macbride could not be consulted when this publication was ready to go on the press. In light of information not available to

Mr. Macbride when he saw the page proofs—and information supplied by telephone by Conrad V. Morton, astute student of the Solanaceae—it was decided to take out of the manuscript two unpublished specific entities which were credited to Mr. Morton.

The manuscript, other than the change mentioned and necessary revision of the key to reflect the modification, has been left as Mr. Macbride wrote it.

The specimens which Mr. Macbride cited under the two specific entities which we have deleted from the *Flora* have been annotated by Langhammer as *Browallia americana* L. (broad sense).

These specimens, as Mr. Macbride cited them, are:

Huancavelica: Surcubamba, *Weberbauer 6496*.—Ayacucho: Estrella, *Killip & Smith 23083*, type. Puquio, *Ferreyra 5467* (flowers large); *22683* (flowers large, det. Standley, *B. grandiflora*).—Cuzco: Tunguimayo, *Balls*. Potrero, *Vargas 1750*.

Piura: Amotape Hills, *Haught 56*. East of Talara, (*Haught & Svenson 11555*). Piura to Ñomala, *Weberbauer 5942*. La Brea, *Horton 11585*. Negritos, *Haught 8*. Near Sullana, *Haught 152*. East of Cape Parina, *Haught 120*. South of Paita, *Haught 236*.—Lima: Obrajillo, (*Cruckshanks*, det. Hooker). Ecuador.

For those who may wish to treat the Peruvian species of *Browallia* more conservatively the following key will distinguish the two specific concepts maintained according to Langhammer's annotations on our specimens. The concept of *B. americana* L. is, of course, in the broad sense.

Corolla tube about 4 cm. long, the limb 4–5 cm. broad; calyx in flower about 2 cm. long, distinctly asymmetrical, the lobes linear-lanceolate and about half as long as the calyx tube. *B. speciosa.*

Corolla tube mostly less than 2 cm. long, the limb about 2 cm. broad; calyx in flower about 1 cm. long, the lobes narrowly oblong to narrowly triangular or sometimes ovate, usually less than half as long as the tube. . . . . *B. americana.*

Editor's note.]

KEY TO BROWALLIA

Calyx lobes ovate-subulate, acuminate, subequaling tube; solitary flowers to 4 cm. long, 5 cm. across. . . . . *B. speciosa.*

Calyx lobes oblong-elliptic or suboval, obtuse to subacute, much shorter than tube; pedicels more or less elongating in fruit, then at least twice as long as calyx.

Floriferous branchlets or solitary flowers from or above often reduced sessile or subsessile leaves.

Pedicels, especially the lower, much longer in fruit. *B. peduncularis.*

Pedicels, even the lower, rarely more than twice longer than fruiting calyx. . . . . *B. Dombeyana, B. abbreviata.*

Floriferous branchlets or solitary flowers from axils of little reduced shortly petioled leaves . . . . *B. speciosa, B. grandiflora.*

Calyx lobes ovate-lanceolate (or suboblong), acute to acuminate; pedicels and calyx subequal even in fruit, the former unless the lowest not or little elongating; leaves usually only slightly reduced above, sometimes remote (cf. *B. speciosa*).

Calyx lobes somewhat divergent or pedicels approximate, the latter sometimes a little longer in fruit.

Pedicels at least as long as calyx; leaves glabrate. *B. grandiflora.*

Pedicels shorter than calyx; leaves hirtellous. . . . . *B. viscosa.*

Calyx lobes erect or suberect; solitary leafy-bracted pedicels little longer in fruit. . . . . *B. americana.*

Browallia abbreviata Benth. Voy. Sulph. 144. 1844.

Similar to *B. grandiflora* Graham but typically distinguishable by the short broadly campanulate calyx, the oval or ovate-oblong divisions early subequaling the tube.—In the Dombey specimen (in flower, Herb. DC.) the calyx lobes are about half as long as the tube! It is *B. Dombeyana* in part but the leaves are petiolate; *Metcalf 30320* has calyx 6 mm. long, broad teeth scarcely 2 mm. long, leaves sessile to petioled; calyx as in *B. peduncularis* often purple-lined or -spotted; these specimens may be phases of *B. peduncularis* Benth. or (and) *B. viscosa* HBK. depending on the significance of the genetic characters. The calyx is about half the size of *B. viscosa.* F.M. Neg. 7787 (Dombey).

La Libertad: Hacienda Campoden, *Nuñez 437* (toward *B. viscosa* in calyx).—Lima: Huamantango, (*Barclay,* type). Near Lima, (*Cuming 1078*). Puruchuco, (*Mathews 712*). Chosica, *Weberbauer 5348* (det. Johnston, *B. viscosa*). Prov. Cañete, *Vargas 9317.* Viso,

Goodspeed Exped. 11527. Lomas of Asia, *Grant 7494.* Matucana, *194* (distr. as *B. viscosa*); *Raimondi* (det. Werdermann, *B. demissa*). Toward Canta, *Ferreyra 7267* (det. Cowan). Valle de Chillón, *Nuñez 909.* Surco, *Ferreyra 3456; 6104* (det. Cowan, *B. viscosa*). Without locality, *Dombey 321* (det. Bentham).—Huánuco: Edge of cultivated field, *4217; 1459* (toward *B. viscosa*).—Ayacucho: Puquio to Lucanas, *Metcalf 30320* (det. Morton).—Ica: Above Pisco, *Weberbauer 5398.*

Browallia americana L. Sp. Pl. 631. 1753. *B. demissa* L. Syst. ed. 10. 1118. 1758–59.

Slender hollow-stemmed annual, lightly pilose or essentially glabrous, rarely slightly glandular even to the calyx; pedicels about 5 mm. long in fruit, the calyx teeth then ovate, acute, less than half as long as the tube or about 2 mm. long; corolla to about 2 cm. long; seeds brown, densely foveolate.—Stems and leaves soft, the flowers solitary (Svenson). Description from *Raimondi 1871;* all his specimens det. Werdermann.

Tumbez: Toward Matapato, *Ferreyra, Cerrate & Tovar 10682.*—Cajamarca: Cascas, *Raimondi.*—San Martín: Moyobamba, *Raimondi 1871; Klug 3376* (det. Morton); *Woytkowski 35305* (det. Cuatrecasas); San Roque, *Williams 7126; 7167; 7407; 7622.*—Lima: Hills of Lurín, *Ruiz & Pavón.*—Huánuco: Cuchero and Pillao, *Ruiz & Pavón.*—Pasco: Quillasu, *Soukup 3302* (det. L. B. Smith).—Junín: Biscaton, *Raimondi.*—Loreto: Iquitos, *Williams 8105.* Widely distributed in subtropical South America.

Browallia Dombeyana Damm. Bot. Jahrb. 37: 642. 1906.

Branches scarcely 1 mm. thick; leaves sessile or nearly (petioles to 1 mm. long), ovate-lanceolate, obtuse, 8–15 mm. long, 3–8 mm. wide, glabrous; pedicels 1–2 mm. long, pulverulent; calyx campanulate, minutely glandular pilose as corolla, the oval lobes scarcely 1 mm. long; corolla hypercrateriform, tube cylindric, 1.5 cm. long, 1 mm. in diameter, throat 3 mm. long, 2 mm. in diameter, lobes unequal, obtuse; stamens 4, filaments 2 mm. long, pilose; ovary apically pilose, style 1 cm. long, stigma broadly lobed.—The 2 upper filaments connate in type but doubtfully always (author); almost certainly a phase of *B. abbreviata.* F.M. Neg. 3050.

Lima: Cerro Amancaës, *Raimondi* (det. Werdermann); *Ferreyra 4048* (det. Cowan). Matucana, *Raimondi.* Lurín, Pachacama, *Ruiz & Pavón;* (*Dombey,* type).

Browallia grandiflora Graham, Edinb. Phil. Journ. 10: 168. 1830. *B. cordata* G. Don, Gard. Dict. 4: 478. 1838.

Diffuse (at least in cultivation) branching annual, the soft stems and leaves usually glabrous or the upper as the calyces early viscid- or glandular-villosulous or -puberulent; leaves ovate, acute or acuminate, more or less attenuate or perhaps sometimes subcordate at base, the nerves prominent beneath; flowers solitary on straight peduncles in the axils of the reduced subsessile upper leaves, thus also laxly foliose-racemose at the ends of branches; calyx 5-lobed, nervose, about 1 cm. long, the segments sometimes spreading, typically obtuse or retuse, usually shorter than tube; corolla tube at least 2 cm. long, slightly ampliate, in type glandular puberulent, greenish-yellow, dark striate, limb white or pale lilac with yellow throat, bilabiate, 3 cm. across or larger; upper filaments dilated, rather recurved, puberulent, exceeding the glabrous apically curved style, the green peltate stigma obscurely lobed.—The black seeds of specimens determined as this species are striately ridged-tuberculate. Illustrated, Bot. Mag. 58: *pl. 3069;* Bot. Reg. 16: *pl. 1384* (*B. cordata?*).

Piura: Canchaque, *Ferreyra 3153* (det. Cowan with query).—Lima: Yazo near Canta, (*Cruckshanks*, type, from seeds); *Weberbauer 5295*. Puruchuco, (*Mathews 511*). Chosica to Matucana, *Goodspeed 113321* (det. Johnston); *209; 2896*. Río Santa Eulalia, *Goodspeed & Stork 11485; Horton 10999*. Río Rimac, *Goodspeed & Metcalf 30235* (det. Morton). Río Chillón, *Pennell 14487* (toward *B. peduncularis*). Surco, *Soukup 3733; Weberbauer 5210; Ferreyra 6939*.—Huánuco: Huamincha, *Woytkowski 34204* (det. Cuatrecasas).—Junín: Utcuyacu, *Woytkowski 35361* (det. Cuatrecasas, *B. viscosa*). San Ramón, *Constance & Tovar 2277*. Satipo, *Soukup 2860*.

Browallia peduncularis Benth. Bot. Voy. Sulph. 143. 1844.

Similar to *B. grandiflora* but leaves (typically) scabrous-hirtellous both sides, the upper sessile; flowers few in reduced leaves, axillary or loosely racemose; calyx-teeth oblong typically, about equaling the tube, usually shorter; peduncles mostly elongate, 2.5–8 cm. in fruit.—Apparently always viscid-pubescent. The very sessile or clasping leaves are noteworthy in type but character apparently variable; probably a phase of *B. abbreviata* or *B. grandiflora* Graham. F.M. Neg. 23042 (*Mathews*).

La Libertad: Usquil, Prov. Atuzco, *Ferreyra 7361* (det. Cowan).—Lima: Huamantanga, (*Barclay*, type). Puruchuco, (*Mathews 512*,

det. Bentham). San Buenaventura, *Pennell 14514; 14517; 14569.* Obrajillo, *Wilkes Exped.* Canta, *Velarde Nuñez 920.* Trapiche, Prov. Canta, sandy wash, *Hutchison 1021.* Lomas Patirilca, *Goodspeed Exped. 9229.* Ambar, *Goodspeed Exped. 9229.* Quive, *Pennell 14311.*

Browallia speciosa Hook. Bot. Mag. 73: *pl. 4339.* 1847.

Somewhat suffrutescent, erect, branched, glabrous or essentially; petioles stout, 5–10 mm. long; leaves ovate-elliptic, acute at base, acuminate, 5 or 6 cm. long, 2–2.5 cm. wide, nerves prominent beneath; peduncles solitary, about 2 cm. long in flower; flowers to 4 cm. long, 5 cm. across; calyx lobes subalate or ovate, long-acuminate, 10–12 mm. long, nearly as long or longer than the tube; corolla tube at least 2.5 cm. long, lobes ovate, acute or some broadly acuminate, 1–1.5 cm. long, striate, dark purple above, pale beneath, the throat white; filaments ciliate; style nearly as long as tube, stigma 2-lipped, 4-lobed within the lip (Hooker).—Distinguished by author from *B. grandiflora* Graham by the larger flowers, the segments not retuse nor bifid.

Huánuco: Pozuzo, *Raimondi* (det. Werdermann). Colombia.

Browallia viscosa HBK. Nov. Gen. & Sp. 2: 373. 1818.

Diffuse herb several dm. tall, the attenuate branches terete, the younger as the peduncles and calyces viscid-hirtellous; petioles about 1 cm. long; leaves subrotund-ovate, obtuse, 2.5– nearly 4 cm. long, 2–3 cm. wide, membranous, reticulate-veined, hirtellous both sides; peduncles solitary in the axils, approximate toward apex of branchlets, in fruit 6 mm. long; flowers violet, 18 mm. long, calyx violet-tinged, lobes lanceolate, erect; tube of glabrous corolla twice as long as calyx, lobes unequal, obovate, emarginate, the larger white-spotted at base; filaments pilose as ovary, the capsule pubescent apically; seeds brown, angled, scabrous.—After authors; Bentham noted calyx teeth as subdivergent, oblong, shorter than tube, pedicels and calyx subequal, upper racemose; this seems to describe the Peruvian specimens and may suggest that they merge with *B. grandiflora* Graham; the following specimens are less pubescent than the Ecuadorian (type).

Cajamarca: Cutervo, *Jelski 162; Raimondi* (det. Werdermann). Huambos, *Soukup 4507* (det. Cowan). Monte Seco, *Soukup 3854.* —Amazonas: Chachapoyas, (*Mathews 3174,* fide Bentham).—Lima:

Canta Valley, (*Cruckshanks*). Pillao, Lima & Cheuchín, *Ruiz & Pavon* (in Herb. Madrid). Between Matucana and Surco, *Weberbauer 5210.*—Huánuco: Valley of Río Chinchao, *Stork & Horton 9430; 9867* (both det. Standley, *B. americana*). Mito, *3426.*—Junín: Huacapistana, *Killip & Smith 24125.* Tarma, *Raimondi* (det. Werdermann). Ecuador.

25. STREPTOSOLEN Miers

A finely scabrous pubescent or hirsutulous shrub related to *Browallia* and *Brunfelsia* but with yellow and burnt orange flowers, the corolla tube spiralled, especially toward the greenish base.

Streptosolen Jamesoni (Benth.) Miers, Ann. Mag. Nat. Hist. ser. 2, 5: 209. 1850. *Browallia Jamesoni* Benth. in DC. Prodr. 10: 197. 1846.

Usually leafy, 1–2 meters high; leaves ovate-elliptic, rugose, about (1) 1.5– about 3 cm. long, 9–15 mm. wide; flowers 2 cm. long, in subcorymbose cymes.—Inflorescence strigillose; in the var. *hirtella* Vatke, hirsutulous (*Weberbauer 4152*, Cajamarca). Corolla is orange except for greenish tube, and the fine white trichomes are glandular (collectors).

Piura: Abra Porculla Pass, Prov. Huancabamba, 2,100 meters, *Hutchison 1384.* Valley of the Quiros, Prov. of Ayavaca, *Weberbauer 6344; Soukup 4339.* Canchaque, *Ferreyra 3137.*—Cajamarca: Cutervo, *Raimondi* (det. Werdermann). Callocate, *Jelski* (det. Zahlbr.). Chugur, *Weberbauer 4152.* Socota, *Stork & Horton 10117* (det. Standley). Huambos, *Soukup 4499* (det. Cowan). Ecuador; Colombia.

26. BRUNFELSIA [Plum.] L.

Smooth shrubs or small trees with entire leaves and showy terminal or clustered flowers. Corolla similar to *Browallia* except in size. Perfect anthers 4. Fruit fleshy or coriaceous, tardily or not dehiscent.—Otto Brunfels was a German physician and botanist of the sixteenth century. Monachino, Phytologia 4: 342–347. 1953, gave a clear and succinctly organized list of the species names, noting probable validities, in connection with his new species *B. mire* of adjacent Bolivia—a helpful account, closing with the pertinent remark: For a true understanding of the species of *Brunfelsia* a critical revision of the whole genus is required.

Leaves oblanceolate.

Corolla tube 2.7–3.5 cm. long; calyx glabrescent, to 14 mm. long. *B. mire.*

Corolla tube about 2.5 cm. long; calyx pubescent, longer. *B. hydrangaeformis.*

Leaves elliptic or oboval-oblong.

Pedicels to 2 cm. long; corolla lobes narrow..... *B. maritima.*

Pedicels typically short; corolla lobes broad.

Corolla tube 2–2.5 cm. long..... *B. bonodora.*

Corolla tube 3–4 cm. long..... *B. grandiflora.*

Brunfelsia bonodora (Vell.) Macbr. Field Mus. Bot. 8: 112. 1930. *Besleria bonodora* Vell. Fl. Flum. 261. 1825. Icon. 5. *pl. 80.* 1827. *B. latifolia* (Pohl) Benth. in DC. Prodr. 10: 199. 1846. *Franciscea latifolia* Pohl, Pl. Bras. Icon. 1: 3, *pl. 1.* 1827.

Branchlets glabrous, subterete, longitudinally rugose; petioles to 4 mm. long; leaves ovate-lanceolate or oblong, often somewhat obovate, mostly acuminate, more or less abruptly contracted at base, apically crowded, subundulate, firm-membranous, glabrous or obscurely pubescent on nerves beneath, minutely punctate, often 1–2 dm. long, at least half as wide, nerves rather prominent, veins obviously reticulate; peduncles usually developed; pedicels 4 mm. long or longer; calyx tubular-campanulate, membranous, drying coriaceous, reticulate-veined, the slender corolla tube at least twice longer, this curved above and with spreading rounded violet or white lobes; capsule fleshy (Bentham).—Mostly after J. A. Schmidt in Mart. Fl. Bras. 8, pt. 1: 258. 1862. As implied by Monachino, the name of Vellozo may not apply to the Peruvian tree, the name, as he remarks, transferred by me, "following the leader" (in this case Bentham) without judgment as to the extent of its application; apparently it is the earliest name for a species, perhaps only of Brazil, with a lax inflorescence; perhaps then the following collections are wrongly determined or require a new name, but the species may be more variable than as yet realized; most of the following specimens have pedicels 5 (–10) mm. long, calyces 5–10 mm. long, corollas with tube 2–3 cm. long; mostly referred by Standley (often with query) to *B. maritima* Benth., questioned also by Morton.

San Martín: Moyobamba, *Klug 3326; Raimondi* (det. Werdermann); *Mathews* (det. Bentham, *B. latifolia*). Tarapoto, *Williams 5482; Ferreyra 7778.* Near Bellavista, *Ferreyra 4760; 4812.*—Loreto:

Yurimaguas, *Killip & Smith 28056; 28178.* Masisea, *Hobroyd 19.* Río Mazán, *José Schunke 8.* Rancho Indiana, *Mexia 6444.* Balsapuerto, *Klug 2880.* Bolivia; Brazil. "Chiric-sanango," "z(s)anango."

Brunfelsia grandiflora D. Don, Edinb. Phil. Journ. 86. 1829.

Small glabrous tree, the leaves apically crowded or scattered on the flowering branchlets; petioles stout, 5–10 mm. long; leaves subcoriaceous, oblong-elliptic, slightly narrowed to acute base, shortly and subacutely cuspidate, 1.5–2 dm. long, 5–8 cm. wide, the 5–7 slender lateral nerves and laxly reticulate veins somewhat conspicuous only beneath; bracts caducous; pedicels 1 cm. long; calyx 1.5–2 cm. long, the ovate teeth obtuse or mucronulate; corolla tube 3.5–4 cm. long, the limb 3–5 cm. across, the lobes subrotund.—Bailey & Raffill, Standard Cycl. Hort. 581. 1914, referred this to *B. calycina* Benth., var. *macrantha* (Lem.) B. & R., but from a study of cultivated plants. The genus needs revision. The type locality is near Dept. Huánuco. Cuzco and Puno specimens have smaller flowers but calyces about 1.5–2 cm. long.

San Martín: Uchiza, (*Ruiz & Pavón*, type).—Huánuco: Divisoria, *Woytkowski 34536* (det. Cuatrecasas); *Ferreyra 985.*—Cuzco: Echarate, *Goodspeed Exped. 10461.*—Puno: Near Puno, *Soukup 446.*

Brunfelsia hydrangaeformis (Pohl) Benth. in DC. Prodr. 10: 195. 1846. *Franciscea hydrangaeformis* Pohl, Pl. Bras. Icon. 1: 717. 1827.

Similar to *B. mire* but with somewhat glandular hirsute calyx, 2.5 cm. long or longer, longer corolla, also slightly glandular and, especially, prominently nerved and finely reticulate-veined.—The Peruvian collection, not seen since Monachino's study, may rather be referable to his species. Illustrated, Bot. Mag. *pls. 72, 4209.*

Loreto: Tierra Blanca, middle Marañón, *Tessmann 4921* (det. Werdermann). Bolivia? Brazil. "Chirisanangu" (Tessmann).

Brunfelsia maritima Benth. in DC. Prodr. 10: 200. 1846.

Type glabrous; leaves subsessile, rounded (rarely narrowed) at base, scarcely acuminate, less than 5 cm. long; cymes few-flowered; calyx lax, turbinate-campanulate, shorter than 2.5 cm., slender corolla tube half again as long.—Type from Taipu (Río Janeiro) by Lund. J. A. Schmidt, in Mart. Fl. Bras. 8, pt. 1: 258. 1862, referred here *Spruce 1495* and other collections from the upper Amazon, some

with much longer pedicels and with pubescent leaf-nerves; species is included only because several Peruvian specimens have been referred here, as *Mexia 6444*, *Schunke 8*, from Loreto, with query by Standley.

Cuzco: Echarate, *Goodspeed Exped. 10461?* (cf. *B. bonodora*). Brazil.

Brunfelsia mire Monachino, Phytologia 4: 342. 1953.

Glabrous (unless the bracts and flowers), the tube of the violet hypocrateriform corolla about twice the length of the campanulate calyx, this at most 14 mm. long; petioles 3–8 mm. long; leaves oblanceolate, narrowed to base, acuminate, 18–26 cm. long, 5–8.5 cm. wide, subcoriaceous, pale beneath with 12 or 13 pairs of lateral nerves, the vein reticulation prominent, areolae broad; flowers many, crowded, bracts sparsely and minutely pubescent, pedicels glabrous, to 8 mm. long; calyx reticulate venulose, lobes about 3 mm. long, corolla tube to 3.5 cm. long, slightly curved above, glabrous or subglabrous, limb 3.2–5 cm. across.—Has been confused with *B. hydrangaeformis* (Pohl) Benth. which it resembles superficially in leaves; it differs in the venation, the smaller glabrescent calyx, the longer extended corolla; the affinity is rather with *B. maritima* Benth. and relatives (author); possibly the specimen referred by Werdermann to *B. hydrangaeformis* (Pohl) Benth. is rather referable here.

Plant used in Bolivia as a paralysant of the voluntary muscles and against cutaneous parasites; see Rusby, Journ. Am. Pharm. Assoc. 13: 101–102. 1924; Youngken, l.c. 14: 195–200. 1925 (Monachino).

Peru (possibly). Bolivia. "Mire."

27. SOLANUM L.

Lycianthes (Dunal) Hassl. Ann. Cons. Jard. Bot. Genève 20: 180. 1917, also Bitter, Abh. Nat. Verein Bremen 24: 292–520. 1919, fide Morton, Contr. U. S. Nat. Herb. 29: 54. 1944. *Lycopersicum* Miller, Gard. Dict. Abr. ed. 4: 3. 1754, fide Wettstein, Pflanzenfam. VI, Abt. 3b: 24. 1891.

Reference: Dunal, in DC. Prodr. 13, pt. 1: 27–387. 1852.

Plants highly varying in duration, habit and vegetative characters, but ordinarily calyx entire to 5–10-apiculate, dentate or bilobate, corolla rotate to campanulate, stamens equal or unequal, more or less connate or connivent, anthers dehiscing by pore, chink or slit, berry most often globose.

For practical purposes of identification—the basic purpose of this work as stated in the preface—the group divisions, except *Tuberarium* (to be contributed later) and *Lycianthes* (after Morton) have not been defined here as proposed or adapted by Dunal because they are vague in greater or less degree, due no doubt to lack of information and/or understanding. Morton, U. S. Nat. Herb. 29: 41. 1944, in reference to Dunal wrote: The same species is sometimes described under different names in different sections. Bitter in his incomplete studies made some progress in more natural demarcation of certain groups but he rarely clarified the classification of many related Peruvian species; it is of interest that he himself, even as I, in preparing an account of the species of one country presented a partly expedient key. Morton, l.c. 54–55, remarked that the two subgenera are the natural cleavage, yet also in these principal divisions (here three with inclusion of *Lycopersicum*) there are a few exceptions of complete concomitance of characters considered to be diagnostic. Wettstein, l.c., designated five sections, including the three subgenera; these are not always in usable contrast to each other but the following subdivisions approximate them. Apart from anther dehiscence he regarded equal or unequal filaments as indicating relationship, also presence of prickles; neither in themselves are of value, occurring, as simple or divided leaves, in otherwise probably similarly derived species. Probably no single characteristic is anywhere reliable, always constant, in this large genus; certainly, for example, position and nature of inflorescence is obscure or secondary in merit. Pubescence absent to richly presented in great variety, often more than two or more sorts intermixed, has of course been the basis or an associated character for species definition; apropos is the paper by Reed C. Rollins, Rhodora 60: 145–152. 1958, illustrating the taxonomic insignificance of presence or absence of trichomes—at least often; he observes that characteristics under control of the simplest gene systems are expected to be least reliable as a basis for classification; obviously proposal of new species in this group would have contributed nothing to their ultimate correct classification; reluctantly here and of course in all of this work I have had to retain species proposed by my contemporaries in circles into which angels would surely fear to tread. But perhaps the following groups as devised here, while only general in their connotation, will facilitate determination of the Peruvian species proposed to date (1958), which, so graphically observed by Morton, was impossible from the (nevertheless meticulous and detailed) pioneer work of Dunal.

In the berries of some species there occur "stone granules" possibly roughly similar in origin to the stone cells in fruits of *Pyrus* (Morton). Bitter thought that their presence or absence, number, position and size were constant in a given species; Morton doubted the taxonomic significance of this character, in any case, still to be proved, but Stebbins and Paddock, Modroño 10: 70–81. 1949, in an incompleted study of the *Solanum nigrum* complex used it as a supplementary aid to specific identification; their work is the most important contribution that has come to my attention; they note the need of extensive field work and the difficulty of practical application (as regards the granules) in the study of herbarium materials, an opinion entirely in accord with mine. Bitter's principal accounts of stone cells in various genera and species are in Abh. Nat. Verein Bremen 23: 114–163. 1914, and Bot. Jahrb. 45: 483–507. 1911. Only genetic investigations similar to that of Stebbins will substantiate or disprove the validity of many of the characters now used for group and species demarcation; so, expediency has compelled me to key out with doubt many plants cited as species.

An informative illustrated account of the ornamental species grown in Argentina has been prepared by Raul Martinez Crovetto, Technical Publication 26 from the Revista de Invest. Agric. 2: 179–196. 1948; it includes eleven species, among them *S. auriculatum* Aiton, *S. melongena* L., *S. Rantonnetii* Carr., *S. dulcamara* L., *S. Seaforthianum* Andrews, *S. capsicastrum* Link, and *S. pseudocapsicum* L., all of which are probably to be found in Peruvian gardens. In Gardener's Chronicle for 1940 E. K. Balls has an interesting paper, "Potatoes and Other Plants in the Andes."

Species probably not Peruvian or not noted in the following text include *S. cymosum* Herrera, Contr. Fl. Dept. Cuzco 2: 168. 1921, described as an annual, leaves deeply pinnatifid, flowers blue, used as a sudorific and laxative under the name "Kusmaillu." *S. havanense* Jacq. Enum. Carib. 15: 159. 1760, of Cuba, recorded by Ruiz and Pavón, Fl. Peruv. 2: 39. 1799, from Acobamba and Picoy near Tarma must be an error in determination. *S. macrophyllum* Dunal, Hist. 199. 1813, is *S. lancifolium* Miller of Mexico, fide Schulz in Urban, Symb. Ant. 6: 243–244. 1909. *S. micranthum* Willd. ex Roem. & Schult. Syst. 4: 663. 1819, as to Peru is some other species according to Schulz, l.c. 166, but to it Sendtner in Mart. Fl. Bras. 10: 19. 1846, referred a collection by Poeppig from Manaos, this some species of section *Leiodendron.*

1. Subgenus LYCOPERSICUM

Anthers fusiform, connate, the oblong cells sterile-appendaged to base; leaves pinnate or bipinnate.

2. Subgenus PACHYSTEMONUM

Anthers stoutly cylindric or ovoid-ellipsoid, not or little elongate nor attenuate, at least only obscurely; pores terminal, often oblique and subequaling the cell-diameter, usually during anthesis becoming lateral chinks, rarely extending to base. Species all unarmed except one species of *Lycianthes*, with branchlets sometimes apically indurate.

KEY TO SECTIONS OR EXPEDIENT GROUPS (SERIES) OF SUBGENUS *Pachystemonum*

Section *Tuberarium*[1]

Leaves mostly unevenly pinnatifid, pedicels clearly articulate at or above base, subterranean stems often tuberous.—An exception in Peru is *S. muricatum* Aiton, the leaves entire; several species apparently are not tuberiferous; *S. montanum* L. with merely repand leaves has a tuber-like root but is allied to species listed in the next group.

Section *Morella* (*Dulcamara*, part)

Leaves entire or somewhat lobed but never alately decurrent to stem (often more or less decurrent on petioles) and lobes never alately joined as in some species of next group with more or less divided leaves; flowers minute to about 1 cm. long, few to many in pedunculate lateral inflorescences; anthers early apically bipored; annuals or perennials, rarely partly ligneous, often diffuse (*Dulcamara*, mostly *Morella*, key, p. 164).

Series 3

(Artificial group of various species, mostly compound leaves)

Leaves usually at least in part compound (ternate, pinnate, multipinnate) sometimes only more or less divided, the divisions

[1] Text for this section is being contributed. When available, it will be published separately in continuation of the present number. (*Ed.*)

alately joined, or if merely repand-lobed always alately decurrent on stems (*S. phyllanthum*) or root tuberiform (*S. montanum*); calyx sometimes truncate, teeth minute; anther pores small or medium, terminal or shortly lateral; plants various, sometimes elongate, diffuse or subscandent.—See *Leiodendron* for related species with entire leaves and *Cyphomandra* in fruit. In part *Polybotryon* (*Bassovia*), *Regmandra*, *Dulcamara* (key, p. 177).

Series 4

(Mostly *Leiodendron*, sens. lat.)

Shrubs or small trees, virgate half-shrubs, rarely diffuse, or subscandent, then simple or nearly, a few vines, never prickly, leaves entire; inflorescence various, calyx usually well-lobed or dentate, not truncate (Peru); anther pores ordinarily large, obliquely introrse. Entire-leaved *Dulcamara*, *Polybotryon*, trailing or 4-merous *Annarichomenum*, *Anthoresis*, *Anthopleuris*, *Leiodendron* (key, p. 191).

Section *Lycianthes*

Calyx truncate but usually with 5 or 10 more or less developed teeth, these sometimes minute or obsolete; erect or scandent shrubs, rarely repent herbs; leaves entire, often geminate; flowers axillary or subaxillary, 1–several, infrequently on a short peduncle; anther pores various (*Lycianthes*, key, p. 225).

3. Subgenus LEPTOSTEMONUM

Anthers cylindric, usually long– or clearly attenuate, the pores minute or small, terminal or sometimes widening or rarely elongating; plants mostly aculeate (key, p. 242).

1. Subgenus LYCOPERSICUM

Annual or perennial herbs with pinnate or bipinnate leaves, yellow flowers in simple extra-axillary racemes or furcate cymes, pedicels articulated near or above the middle, but, all species considered, marked only by the development of an apical sterile tip to the anther cells, these dehiscent their entire length as sometimes in otherwise similar species (*L. lycopersicoides*, *S. Pennellii*, section *Tuberarium*); the former has been hybridized with *S. Lycopersicum* L. cf. Rich. Proc. Nat. Acad. Sci. 37: 741–744. 1951; Correll, Modroño, 14: 232–236. 1958.

KEY TO SUBGENUS *Lycopersicum*

Reference: Cornelius Muller, U. S. Dept. Agric. Misc. Publ. 382: 1–28. 1940.

Leaflets all or mostly crenate, lobulate, or incised, pubescent or puberulent.

Plants canescently puberulent; corolla at least 1 cm. long, orange-yellow; berry (as seeds or these only at tip) pubescent. *S. peruvianum.*

Plants greenish, more or less divaricately hirsute; corolla yellow; berry or seeds or both pubescent.

Stems slender, sprawling or lax; corolla lobed.

Leaves bicolor; berry glabrous; seeds usually lanate. *S. lycopersicum.*

Leaves concolor; berry pubescent; seeds subglabrous. *S. Corneliomulleri.*

Stems stout, erect or trailing; corolla subentire or acuminate-lobulate..... *S. agrimoniaefolium.*

Leaflets all entire or subentire, glabrate or puberulent; corolla small, usually yellow, lobed; berry usually glabrous as seeds. *S. pimpinellifolium.*

Solanum agrimoniaefolium R. & P. ex Dun. in DC. Prodr. 13, pt. 1: 24. 1852. *Lycopersicum hirsutum* Humb. & Bonpl. in Dun. Sol. Syn. 4. 1816; 21, not *S. hirsutum* Dunal, l.c. *L. agrimoniaefolium* R. & P. ex Dun. l.c. 24.

Well-marked typically by the abundant hirsute pilose indument, most trichomes 2.5–3.5 mm. long, shorter, glandular and a few appressed stellate ones intermixed; pseudo-stipules present; larger leaflets petiolulate, medium and smaller sessile, all subentire and usually repand-dentate; cymes dichotomous, all parts bracted unless the 10–12 pedicels, these early filiform, 1.5–2.5 cm. long, often abruptly deflexed below the flower after anthesis; calyx lobes 8–9 mm. long, acuminate or finally obtuse and 1.5 cm. long, the lobes 3–4 mm. wide; corolla yellow, rotate, about 3 cm. across, the broad acuminate tipped lobes 5–6 mm. long, 6–8 mm. broad; anther sacs 7 mm. long, the appendages 4 mm. long, rather firmly joined, staminal column 3–4 mm. thick; style more or less exserted; fruit 1.5–2.5 cm. in diameter, coarsely long-hirsute, greenish-white, purplish-striped; seeds dark brown, glabrous except minutely at

apex.—*L. hirsutum* forma *glabratum* Muller, 22, from Ecuador, besides being less pubescent, has very slender calyx lobes, corolla 2 cm. across, lobes 3–4 mm. broad. Illustrated, Muller, l.c., *pls. 3* and *9*. F.M. Neg. 2595.

Cajamarca: Inca baths, (*Blood & Tremelling 136*). Hualgayoc, *Soukup 388*. Cascas & Nanchó, *Raimondi* (det. Werdermann).—Ancash: Chacchán, *2553*.—Lima: Matucana, *Weberbauer 79*. Huará, *Goodspeed 11342*. Ambar, *Stork 11463* (det. Johnston). Canta, *Soukup 2826*. Surco, *Soukup 3707*.—Junín: Incahuasi, *Soukup 3196*. Ecuador.

Solanum Corneliomulleri Macbr., nom. nov. *Lycopersicum glandulosum* Muller, U. S. Dept. Agric. Misc. Publ. 382: 23. 1940, not *S. glandulosum* R. & P.

Character in general that of *S. peruvianum* but not at all canescent; stems densely pubescent, the trichomes of three types, the first short, 1-celled, mostly simple, the second capitately resinous-glandular, the third elongate attenuate, rarely capitately stellate; pseudo-stipules at base of leaves similar to the leaflets, these (larger) 5 or 6 pairs erosely dentate or round-lobate, the minor ovate 1–4 mm. long, entire or minutely erose, all closely puberulent, the trichomes 1- or 2-celled, very sparsely stipitate glandular, the rachis glandular pubescent like the stems; inflorescence rarely simple, 6–12-flowered, pedicels 10–18 mm. long, to 2.5 cm. long in fruit, the commonly distributed bracts 5–12 mm. long; calyx 5-parted nearly to base, narrowly lanceolate lobes 5–6 mm. long, in fruit 12–15 mm. long, slightly glandular; corolla about 2 cm. across, medially parted into broadly triangular reflexed lobes, apically subcaudate; staminal columns 7–10 mm. long, the appendage tube recurved, 2–3 mm. long; ovary puberulent, especially at apex; berry globose, 10–12 mm. in diameter, pale with lavender stripes about the top where early densely pilose, puberulent below.—A very stable species exhibiting little variability even under different cultural conditions, most closely related to *L. hirsutum* Humb. & Bonpl. but distinguished by vining stems, smaller and more dissected leaflets. Like the related species it rarely occurs at an altitude as low as about 1,200 meters (author). According to Muller, collected at several localities in the Department of Lima by Blood and Tremelling. Illustrated, Muller, *pls. 3* and *10*.

Lima: Prov. Canta, 7 km. north of Trapiche, gravelly plain, dry wash, flowers yellow, *Hutchison 1013*. Río Rimac, at km. 81,

Goodspeed & Metcalf 30234. Yangos to Cantas, near Lima, *Blood & Tremelling 14, 15* (type sheets U. S. N. A. Herb.). Above Santa Eulalia, above Chosica, *West 3600.* Chosica to Matucana, *Mexia 4077.*—Arequipa: Laspinas, *Eyerdam & Beetle 22150* (det. Johnston).

Solanum lycopersicum L. Sp. Pl. 185. 1753; 10. *Lycopersicum esculentum* Mill. Gard. Dict. ed. 8. 1768.

Becoming a vigorous herb, flowering as an annual but often persisting, the stout more or less succulent or below subligneous stems puberulent to pilose-hirsute, not infrequently viscid-glandular especially above, including the often ample odd-pinnate to bipinnate leaves; stipules none, principal leaflets 2–4 pairs, ovate to lanceolate, petiolate, entire-lobed or pinnate, puberulent, or the rachis glandular-pilose, 3–10 cm. long, about half as wide, the smaller entire, a few mm. to 2 cm. long, sometimes lacking; racemes simple, now and then furcate, 4–5 (–10) -flowered, pedicels 1–1.5 cm. long, articulate at or above the middle; calyx 5–8- or 10-parted nearly to base, the subulate lobes about 1 cm. long, 1 mm. wide; corolla lemon-yellow, medially to three-fourths 5–10-parted, the lanceolate acuminate reflexed lobes about 1 cm. long or longer, glabrous or more or less pilose above and below especially toward tip; stamens 5, 8 or 10, usually soon parted into groups of 2 or 3 at anthesis, the subsessile anthers 5 mm. long, appendages 2 mm. long; style slightly exserted, ovary glabrous; berry 3–10-celled, commonly depressed globose; seeds flat, oval, 3 mm. long, 2–2.5 mm. wide, densely silvery lanate.—Illustrated, Muller, l.c. *pls. 1–4* and *8.*

This is the basic or cultivated form of the species; two recognized forms or varieties have been described as *Lycopersicum esculentum* Mill. var. *pyriforme* or f. *pyriforme* (Dun.) C. H. Mull., the flowers rarely more than 5-merous, berry 2-celled, pyriform; much more distinctive and native to Peru and probably elsewhere in the Andes is the var. *esculentum* (Mill.) Voss, in Vilmorin, Blumengartn. (ed. 3) 1: 721. 1894, or *S. lycopersicum* Mill. var. *cerasiforme* (Dunal) Fosberg, Phytologia 5: 290. 1955, the raceme more or less elongate, corolla about 1 cm. long, lobes 6 mm. long, staminal column narrow, berry 2-celled, globose, 1.5–2.5 cm. in diameter, the less compressed seeds only marginally pubescent. Muller decided that this plant, known in English as the cherry tomato, is the form from which the cultivated plant originated; it is widely cultivated in undeveloped regions. Fosberg, l.c., wrote: there seems to be no more reason for maintaining a separate genus for the tomato than for many other

groups commonly retained within the genus *Solanum;* note also the recent publication of *S. Pennellii* Correll with the author's remark: this and *S. lycopersicoides* Dunal are living evidence in support of the union of the two genera. Type locality, the coast of Peru. Widely distributed at least as an adventive.

Piura: Ñormala, Prov. Paita, *Haught 2.*—San Martín: Tarapoto, *Spruce 4143.* San Roque, *Williams 7264* (det. Standley).—Huánuco: Tingo María, (*Blood & Tremelling 62; 68; 70*).—Junín: La Merced, (*Blood & Tremelling 49; 50; 52; 53*).—Loreto: Puerto Arturo, *Williams 5170* (det. Standley).—Apurímac: Prov. Abancay, (*Vargas,* det. Muller).—Cuzco: Echarate, *Goodspeed Exped. 10482.* Santa Ana, *Cook & Gilbert 1603.*

Solanum peruvianum L. Sp. Pl. 186. 1753; 16. *Lycopersicum peruvianum* (L.) Mill. Gard. Dict. ed. 8. 1768.

Various in habit but usually more or less decumbent, always densely, and more or less canescently, pilose-villous, usually eglandular except the inflorescence; stipules present or lacking; leaves oblong-lanceolate or narrowly ovate, simply or odd pinnate, major leaflets 3–5 pairs, typically unequally rounded at base, subentire to erosely dentate, the minor if present ovate, subsessile, 1–5 mm. long; inflorescence commonly a cyme of two 5–12-flowered racemes or these again dichotomous (rarely simply), racemes 5–9 cm. long, pedicels 5–12 mm. long, the peduncles (3–10 cm. long), rachis and pedicels ordinarily bracted (pedicel bracts sometimes reduced or wanting); calyx parted nearly to base, the 5 linear-lanceolate lobes 5–6 mm. long; corolla bright orange-yellow, 10–13 mm. long, parted medially into triangular acuminate lobes so strongly reflexed that the limb is turned inside out (Muller), dorsally pubescent; staminal column 6–9 mm. long clearly bent to one side, the entire anther sacs 4–6 mm. long; style exserted, stigma capitate; ovary sparsely pubescent, especially near apex, fruit 1–2 dm. in diameter, puberulent, pale with lavender stripe, seeds oblanceolate, glabrous except at tip, pale brown, type "Peru."—*L. peruvianum* var. *dentatum* Dunal (*L. chilense* Dunal; *L. atacamense* Phil. Fl. Atac. 42. 1860, both fide Muller) usually has stipules, larger leaflets deeply lobed or pinnatifid or leaflets subentire, petiolate and cordate; var. *humifusum* Muller, 19, distinguished by the author as densely and very shortly pubescent, minor leaflets usually lacking, the larger entire, ovate-lanceolate. Muller notes that var. *dentatum* varies greatly even to seeds in size and shape; the trichomes are more frequently glandular. Illustrated, Muller, l.c. *pls. 3, 6* and *7.*

Piura: Talara, *Haught 93*. Truxillo, (*Blood & Tremelling*, var. *dentatum*).—Ancash: Chacchán, *2554*.—Lima: Chosica, *West 3600*. Matucana, *159*. Amancaës, *Balls 7073*. Chancay, (*Blood & Tremelling*). San Juan, Magdalena, Piscocucho, (*Blood & Tremelling*, all var. *humifusum*, type, 142).—Huánuco: Cuchero, *Poeppig 1449*.—Junín: San Rafael, *3141*.—Arequipa: Tingo, *Pennell 13147*, var. *dentatum*. Yura, *Carl Schmidt*. Mollendo, *Johnston 3557*.—Cuzco: Via de Santa Ana, *Cook & Gilbert 1405*.—Moquehua: Estaquina, *Weberbauer 7445; 7449*. Chile, and northward to Bolivia and Ecuador.

Solanum pimpinellifolium Jusl. in L. Cent. Pl. 1: 8. 1755; 15. *Lycopersicum pimpinellifolium* (Jusl.) Mill. Gard. Dict. ed. 8. 1768.

Puberulent, the prostrate ascending stems rarely somewhat pilose or glandular, leaves narrowly ovate with usually a pair of small divisions alternating with larger ones, the latter 3-paired, unequally cordate or rounded, subentire, dark green above, paler beneath, the smaller ovate to rotund sometimes wanting; racemes rarely furcate, 12–many-flowered, to a dm. long, glandular-puberulent, the two-ranked filiform pedicels very regularly spaced, 3–15 mm. long, articulate about 3 mm. below the flower; calyx lobes 5, lanceolate-acuminate, 2.5–4 mm. long, glandular-pubescent both sides; corolla bright lemon-yellow or slightly orange, 12–16 mm. across, deeply 5-parted, the narrowly lanceolate lobes long-attenuate, strongly reflected at anthesis, dorsally puberulent anthers subsessile, column 5–7 mm. long, the connate portion slightly shorter than the anther sacs; style slightly exserted, ovary glandular or puberulent, usually becoming glabrous; berry 2-celled, 1–1.5 cm. in diameter, ordinarily glabrous, lustrous red or orange-red, the raceme elongating sometimes 2 dm., the accrescent calyx finally 6 or 7 mm. long, seeds thick, obovate, 3 mm. long, 1.5–2 mm. broad, glabrous except at tip.—Original locality Peru. Related to *S. lycopersicum* var. *cerasiforme* but it is readily distinguished by its more slender habit, more elongate racemes and smaller fruit (Muller, who illustrated it, *pls. 3* and *5*).

Piura: La Brea, *Horton 11582*. Truxillo, (*Blood & Tremelling*).—Lima: Pachacama, *Mexia 8328* (det. Morton). St. Eulalia, *Goodspeed 33147*. East of Lima, *Blood & Tremelling 76*. Chacallo, *Balls 858*. Quillabamba, (*Blood & Tremelling*). Santa Ana, *Cook & Gilbert 1405; 1702*.

Section MORELLA

Leaves entire or somewhat lobed but never alately decurrent to stem (often more or less on petioles), and lobes never alately joined as in species with somewhat divided leaves; flowers few to many in peduncled inflorescences, minute to about 1 cm. long; anthers early bipored apically. Annuals or perennials frequently finally ligneous below, rarely toward apex, usually only firm above where ordinarily hollow-stemmed and the leaves often much shorter than 1 dm. The following species center around the ubiquitous *S. nigrum* L. and probably there are only a few of them that are not dubious. The key attempts by the use of characters scarcely significant to lead to some of the many names proposed.

Corolla, unless in *S. nigrum*, scarcely 3.5 mm. long, usually shorter.

Plants soon glabrate or glabrous; berries (ripe) black, free.

Flowers few, subumbellate or subracemose, the peduncles usually simple; anthers soon 2-chinked, about 2.5 mm. long or shorter.

Calyx lobes distinct, early somewhat reflexing; flowers subumbellate..... *S. inconspicuum, S. nodiflorum.*

Calyx lobes not equally distinct, suberect to appressed; flowers subracemose..... *S. nigrum.*

Flowers small, many, in forked racemes; leaves firm, oblong-elliptic; anthers 2-pored..... *S. corymbosum.*

Plants villous-hirsute; berries not black, partly enclosed. *S. sarachoides.*

Corolla in full anthesis at least 4 mm. long, the peduncles normally at least bifid; anthers often about 3 mm. long or longer (see also glabrate *S. nigrum, S. nodiflorum*); peduncles simple and villous (*S. sarachoides*).

Leaves often less than twice as long as wide, broadly ovate to subrhombic, more or less strongly or unevenly repand-dentate to sublobulate, frequently somewhat caudate, tip entire; trichomes in part glandular.

Calyx lobes ovate, 2–3 mm. long..... *S. excisirhombeum.*

Calyx lobes sublinear, 4–5 and 5–7 mm. long. *S. sinuatiexcisum.*

Leaves about as above; trichomes eglandular or subviscid; peduncles usually furcate..... *S. fragile.*

Leaves often subentire or remotely few repand-dentate (cf. *S. fragile*) never, in Peru, very irregularly dentate, only sometimes not much longer than wide; peduncles (normally) at least 1-furcate, unless *S. sinuatiexcisum.*

Indument (younger parts) somewhat viscid-glandular villous, rarely only viscid-puberulent.

Corollas rotate-stellate; peduncles (types) furcate.

Peduncles much-forked (type) . . . . . *S. probolospermum.*

Peduncles 1–2-furcate . . . . . *S. juninense.*

Corollas campanulate-rotate; peduncles (type) simple. *S. sinuatiexcisum.*

Indument eglandular, rarely obscurely viscid in inflorescence.

Trichomes simple or early 1–few-furcate, rarely lacking or nearly.

Leaves usually much shorter than 1 dm. (expedient character, species).

Leaves rather oblong-lanceolate or ovate-lanceolate; flowers (type) finally about 1 cm. long. *S. Pentlandi, S. arequipense.*

Leaves ovate or broadly ovate-elliptic, often subrotund at base, mostly 5–9 cm. long, about half as wide; flowers often smaller . . *S. Zahlbruckneri, S. furcatum.*

Leaves mostly 1–1.5 dm. long, a third to more than half as wide . . . . . *S. insolaesolis.*

Trichomes at least early mostly or many often pseudo-stellate. *S. sandianum, S. pallidum.*

Solanum arequipense Bitter, Repert. Sp. Nov. 11: 204. 1912. *S. atricoeruleum* Bitter, l.c. 10: 563. 1912, at least as to Peru.

A meter or more high, often clambering, with long divaricate strict or tortuous branches; leaves lanceolate-rhomboid, mostly 5–8 cm. long by about 3 cm. wide, attenuate into a petiole 1–2 cm. or so long, acute, with 2–3 small teeth below the middle, sparsely pubescent; peduncles lateral, 10–12-flowered, 1.5–3 cm. long, forked once; pedicels 6 mm. long; corolla white (or purple), full grown about 1 cm. long and broad, the lobes about 4 mm. long; filaments 1.5 mm. long, anthers nearly twice as long, pubescent as also the elongate style; anthers ellipsoid, nearly 3 mm. long, with oblique subapical introrse pores; berry 7 or 8 mm. thick, stone cells 2.—Type has a rotate-

stellate corolla about 1 cm. long; a more nearly entire narrower-leaved variant of *S. furcatum* Dunal (to which some Junín specimens have been referred by Lyman Smith and by Killip) or *S. coerulescens* Bitter; it probably has an earlier name in *S. dianthum* Rusby, Bull. N. Y. Bot. Gard. 4: 420. 1907; the Rusby plant as to type had only 2-flowered cymes, slender weak pedicels but was probably a reduced state from a shady place as the habitat was "wet mould." The probable variant *S. atricoeruleum* Bitter, l.c. 10: 563. 1912 (Bolivia), was found (by author) to have 5 granules; fruit with 2 subapical stone cells (Bitter). F.M. Neg. 2597. Section *Morella*.

Cajamarca: Huaraz, *Sandeman 4655* (distr. as *S. nigrum*).—La Libertad: Near Cerro Uruchalda, *West 8170*.—Lima: El Ingenio, *Soukup 3661*. Río Blanco, *665; 2966*.—Huánuco: Southeast of Huánuco, *2079*.—Pasco: Quillasu, *Soukup 3321*.—Junín: Huancayo, *Soukup 2703; 3233*. Carpapata, *Killip & Smith 24430; Ochoa 292*. Huacapistana, *Killip & Smith 24181* (det. Morton, *S. sandianum*). —Apurímac: Chincheros, *West 3704* (flowers purple).—Cuzco: San Sebastian, *Pennell 3631*. San Miguel, Urubamba Valley, *Herrera 1539*. Pillahuata, *Pennell 13949*. Huasco, *Herrera 1022*. Achirani, 2,600 meters, *Vargas 11135* (det. Asplund, *S. dianthum*, flowers purple). San Sebastian, *Pennell 13631*. Paso de Tres Cruces, 3,800 meters, *Pennell 13824*. Cerro Machupicchu, *Herrera 3236; Mexia 8079* (distr. as *S. nigrum*).—Arequipa: River-cliffs near Arequipa, *Seler 204*, type. Outskirts of Arequipa, *Sandeman 3781* (distr. as *S. nigrum*).—Puno: Araranca, *Pennell 13464*. Near Puno, *Mexia 04251; Metcalf 30690; Soukup 94; 95; 975*. Bolivia? "Ccaya-ccaya" (Mexia); "ccjaya-ccajaya" (Herrera); "mancato jiechi."

Solanum corymbosum Jacq. Coll. 1: 78. 1790. Ic. Rar. *pl. 40*. 1786; 73. *S. corymbiferum* Gmel. Syst. Nat. 2: 384. 1791. *S. parviflorum* Usteri, Ann. Bot. 6: 61. 1793. *S. cymosum* R. & P. Fl. Peruv. 2: 31, *pl. 160*. 1799. *S. leptanthum* Moc. & Sessé, var. *parvifolium* HBK. Nov. Gen. 3: 24. 1818.

Stem woolly below, flexuose, angled, smooth, sprawling to erect, often subligneous below, 3–10 dm. high; leaves ovate-lanceolate, long-decurrent into the petiole, scarcely acute, entire, repand, or rarely 1–2-lobed, glabrous, 4–7 cm. long; racemes subsessile, cymose, half shorter than the leaves, slightly pubescent; pedicels about 3 mm. long; calyx lobes ovate, subacute; corolla scarcely 2 mm. broad, blue or bluish; berry about 6 mm. in diameter, orange-red.—Often in cultivated ground. Section *Dulcamara*.

Cajamarca: Magdalena, (*Bonpland*, type, *S. leptanthum*, var.).—Amazonas: Chachapoyas, *Mathews* (det. Morton).—Lima: Provinces of Lima and Chancay, *Ruiz & Pavón* (type, *S. cymosum*); *Dombey.* Matucana, *139; 315.* Valle de Chillón, *Velarde Nuñez 874* (det. Morton).—Huánuco: At Huánuco, *Kanehira 207; Ledig 11* (det. Morton).

Solanum excisirhombeum Bitter, Repert. Sp. Nov. 11: 1. 1912. *S. atriplicifolium* Gillies ex Nees, Nov. Act. Caes. Carol. 19, Suppl. 1: 366. 1843, as to Peru.

Viscid-pubescent, especially on the stems and leaf-veins beneath, with spreading many-celled, mostly gland-tipped trichomes; petioles alate, about 1.5 cm. long; leaves nearly rhombic, about 6 or 7 cm. long, 5–6 cm. wide, deeply dentate or sublobulate, the 3–4 lobes sometimes 1 cm. long; inflorescence simple (type), 4–6 (8) -flowered, the peduncle about 1.5 cm. long, the pedicels straight or nearly, finally nodding, about 6 mm. long (–10 mm. in fruit); calyx 4 mm. wide in flower, 9 mm. in fruit, the lobes early 2, finally 3 mm. long; corolla lilac, 7–9 mm. long and broad; filaments 1.5 mm. long, anthers 2.3–3 mm. long; style 5 mm. long, stigma capitate.—Perhaps *S. coerulescens* Bitter is an eglandular state and, like this, a straggling herb, sometimes ligneous at base, flower white or usually white and pink-purple. *S. atriplicifolium* Gillies may be the correct name but according to Bitter, Repert. Sp. Nov. 11: 213. 1913, that Chilean plant has subregularly 8–10-lobulate leaves, inflorescence mostly furcate, calyx in fruit with lobes 7 mm. long, corolla white, 14 mm. across, anthers 4.5–5 mm. long, shorter gland-tipped trichomes on stems and leaves, early dense on calyx without; the important distinction seems to be in the smaller anthers of the Peruvian plant. F.M. Neg. 2604. Section *Morella.*

Used as a remedy for toothache (Weberbauer).

Ancash: Near Tallenga, *Weberbauer 2868*, type.—Lima: Río Blanco, *Killip & Smith 21540; 21630* (both det. Morton). Canta, *Soukup 2829* (det. Morton; cf. note under *S. coerulescens*).—Junín: Tarma, *Killip & Smith 21871.*—Cuzco: Ollantaitambo, *Cook & Gilbert 370* (det. Morton). Near Cuzco Experimental Estac., *Vargas 673.*—Arequipa: Nevado de Chachani, *Pennell 13260.* "Japichina," "muyuccaya" (Cook & Gilbert).

Solanum fragile Wedd. Chloris And. 2: 105. 1857. *S. atriplicifolium* Gillies, var. *minus* Dunal in DC. Prodr. 13: 55. 1852. *S. coerulescens* Bitter, Repert. Sp. Nov. 10: 554. 1912, at least as to Peru.

Stems diffuse, slender, herbaceous or ligneous at base, pubescent; petioles 1–2.5 cm. long, alate about medially; leaves membranous, rhomboid-elliptic, decurrent into petiole, obtuse, 2–5 (8) cm. long, coarsely 1–3- mostly irregularly or sometimes sinuate -dentate, puberulent and ciliate; peduncles 1.5–2.5 cm. long, mostly terminal, umbellately few- to many-flowered; pedicels 5–10 mm. long; calyx subvillous, lobes ovate-oblong, subobtuse, in fruit 1–1.5 mm. long; flowers pale to violet, striate, 12–15 mm. wide, lobes triangular-ovate, obtuse, subvillous, 4 mm. long; anthers yellow (pores lateral), shorter than the somewhat pubescent style.—Has been referred to *S. atriplicifolium* of Chile, a shortly glandular plant with long (4–5 mm.) anthers and calyx enlarged in fruit, characters probably not shared by Weddell's plant, but it is not obviously distinct from *S. Pentlandi* Dunal, or *S. coerulescens* Bitter. Plants 1–3 dm. across, with many ascending stems, a few often divaricate branches; leaves remarkable by the large teeth, these subobtuse, recalling *Chenopodium hybridum* L.; pubescence a little viscid on leaves or rest of plant (Weddell). Perhaps should include *S. excisirhombeum* Bitter as a glandular variant; it is much like it but typically eglandular; pedicels often arcuate-tortuous; of course, may be a part of *S. furcatum* Dunal, range of variation not determined. F.M. Neg. 2598 (*S. atriplicifolium* var. *minus*). Section *Morella*.

Ayacucho: Prov. Lucanas, *Metcalf 30239* (det. Killip, *S. coerulescens*).—Cuzco: Trailing in brush below Machupicchu, *West 8028*. Near Sicuani, *Cook & Gilbert 128*. Ollantaitambo, *Cook & Gilbert 297* (det. Morton, *S. coerulescens*); *Herrera 3427*.—Arequipa: Ditch bank, Arequipa, *Pennell 13048*. Rock slides near Chala, *Worth & Morrison 15704* (leaves repand). Laspinas, *Eyerdam & Beetle 22152* (leaves subentire). Above Atiquipa, *Worth & Morrison 15668*.—Puno: Lake Titicaca, *Meyen* (type, var. *minus*).—Tacna: Candarave, *Metcalf 30373*. Mountains of Tacora, 4,000 meters, *Weddell*, type.

Solanum furcatum Dunal ex Poir. Encycl. Suppl. 13: 750. 1814; 51. *S. chenopodioides* Lam. Illustr. 2: 18. 1793 in part, fide Stebbins & Paddock. *S. violeceistriatum* Bitter, Repert. Sp. Nov. 10: 550. 1912, at least as to Peru.

Glabrous or nearly, the herbaceous upper stems subdichotomous, angulate; leaves ovate, dentate, glabrous; racemes furcate (Dunal). As to Peru: becoming a tall or sprawling (sometimes 2 meters) half-shrub, the flowering branches or stems, usually once-forked inflorescences and leaves beneath more or less densely puberulent with simple or slightly furcate mostly appressed trichomes, often absent, or

mostly, in age; leaves usually ovate, acute but often rather rounded at base, abruptly and shortly or scarcely decurrent, varying from a few cm. to rarely a dm. or so long, about half as wide, entire, undulate-repand or weakly repand-dentate; peduncles lateral, ordinarily 2–several cm. long and forked, frequently fewer than 10-flowered; pedicels crowded or subumbellate, recurved in fruit, usually a cm. long, nearly that in flower; calyx lobes obtuse or subacute, minute or small, in fruit broadly ovate, somewhat accrescent; corolla rotate-stellate, white or purplish, exserted, slightly puberulent below as unequal filaments; anthers 2.5– about 3 mm. long; berry finally 5–7 cm. in diameter, not persisting after maturity, 7–34-seeded and with many large stone cells (Stebbins and Paddock).—The Dombey type may be Chilean and according to Dunal is glabrous except the racemes; it probably is the earlier name for *S. arequipense*. Section *Morella*.

Lima: El Ingenio, *Soukup 3653* (det. Killip, *S. minutibaccatum*). Canta, *Soukup 2832*. Matucana, *380* (toward *S. coerulescens*). Río Blanco, *Killip & Smith 21752*. Huaros, *Pennell 14708*.—Huánuco: Mito, *1630; 1865*. Cani, *3385*. Piedras Grandes, *Woytkowski 153*. Near Muña, *3879*. Tingo María, *Allard 21855* (sens. lat.). Boquerón Pass, *Allard 22112* (sens. lat.).—Junín: Tarma, *Killip & Smith 21791*. La Oroya, *Kalenborn 26* (det. Morton, *S. Pentlandi*).—Huancavelica: Salcabamba, *Stork & Horton 10264*. Chile? "Gapichinia."

Solanum inconspicuum Bitter, Repert. Sp. Nov. 11: 204. 1912.

Pubescence at first dense, short, subappressed; branches in type many, 3–4 dm. long; leaves nearly ovate, abruptly contracted to a petiole 5–8 mm. long, attenuate at apex, with 1–2 short obtuse lobes below the middle, 1.5–2.5 cm. long, 10–12 mm. wide, peduncles lateral, 7–8 mm. (–12 in fruit) long, 2–3-flowered; pedicels 3–4 mm. (–7 in fruit) long; calyx lobes broadly lanceolate, suboblong, 2 mm. long; corolla white, 3.5–5 mm. wide, lobes lanceolate, 1.5–2 mm. long, finally spreading; filaments less than 0.5 mm. long, anthers 1 mm. long; style less than 2 mm. long, pubescent at the middle; berry globose, black, 4–5 mm. thick, seeds 45.—Cf. *S. nigrum* L., from which it is not clearly distinct, the small-leaved tiny-flowered type perhaps an ecological state more or less duplicated in shady or wet places in close competition with other plants. F.M. Neg. 2612. Section *Morella*.

La Libertad: Chicama Valley, *Smyth 19* (det. Killip). Trujillo to Salaverry, *Worth 8893*.—Lima: Morón, above the city of Lima,

Seler 222, type.—Junín: Edge of road, San Ramón, *Constance & Tovar 2278*.—Loreto: Lower Río Huallaga, *Williams 4592a*.

Solanum insolaesolis Bitter, Repert. Sp. Nov. 10: 563. 1912. *S. medianiviolaceum* Bitter, l.c. 562. 1912. *S. violaceistriatum* Bitter, l.c. 550. 1912. *S. brevipedunculatum* Rusby, Bull. N. Y. Bot. Gard. 4: 421. 1907?

Type a half shrub, the upper stems and leaves both sides somewhat pulverulent with multi-celled trichomes; petioles alate, to 1 cm. long; leaves ovate-lanceolate, to 5 cm. long, 1.5– about 2 cm. wide (or larger), entire, attenuate both ends, tip subobtuse, peduncles to 2.5 cm. long, the branches, if present, 3–7 mm. long; pedicels 6 mm. long, nearly twice as long in fruit, violet-tinged as calyces, these campanulate, about 4 mm. across, subobtuse lobes 1.5 mm. long; corolla violet, rotate, to 12 mm. across, the lobes 4 mm. long; filaments 1 mm. long, anthers 2.5 mm. long, pores obliquely subapical; style about 5 mm. long, puberulent above base, stigma capitate; berry subglobose, clearly sulcate medially, 4–5 mm. long, 5–6 mm. broad; seeds about 40, stone cells 8.—After Bitter; probably varies as to size of leaves, anthers, number of stone cells and may be part of *S. furcatum* Dunal; the similar *S. violaceistriatum* Bitter, as to fruits examined, had only 2 stone cells. The Rusby plant, to which Killip allied *Soukup 3618*, may be the same; type had, ex char., petioles 3–4 cm. long, leaves 1–3 dm. long, nearly half as wide, rounded at base, acute both ends, calyx truncate, corolla stellate, lobes 1 cm. long, anthers 6 mm. long. It may be a race of *S. fragile* Wedd., or the collections from central Peru may be rather luxuriant examples of *S. furcatum* Dunal but the leaves are well-decurrent; several specimens, perhaps significantly, are from stream thickets. Section *Morella*.

Lima: Canta, *Soukup 2829*. San Buenaventura, *Pennell 14538*.—Huánuco: Carpish, *Stork & Horton 9898* (det. Standley, *S. coerulescens*).—Junín: Tarma, *Killip & Smith 31912*. Chongos Bajo, *Soukup 3618* (aff. S. *brevipedunculatum* Rusby, fide Killip).—Cuzco: Pacbar, *Pennell 13689*. Valle del Apurímac, *Herrera* (Feb., 1929). Urubamba Valley, *Herrera 1539*. San Miguel, *Cook & Gilbert 872*. Isla del Sol, Lake Titicaca, *Buchtien*, type. Bolivia. "Suito-mullucaya" (Cook & Gilbert).

Solanum juninense Bitter, Bot. Jahrb. 54, Beibl. 119: 11. 1916.

A sprawling shrub or the angled branches scandent; younger branches puberulent villous-glandular toward apex as petioles, these

7–10 mm. long, and the ovate leaves especially on the prominent veins beneath, these in type mostly 3.5–4 cm. long, 2–3 cm. wide, on most specimens longer, acute or subacuminate, entire or with 2–4 teeth on each side toward the subtruncate base; inflorescence at first compact, terminal, in type about 15-flowered, glandular-villous, the 1.5–3 cm. long peduncles forked; pedicels about 1 cm. long; calyx 5 mm. long, 6 mm. broad, the lobes lanceolate, acute; corolla blue-violet, rotate-stellate, about 1.5 cm. wide; filaments about 1 mm. long, style in part densely pubescent (to glabrate), 7 mm. long; stigma globose-capitate; berry 8 or 9 mm. in diameter, seeds (immature) with basal appendage at least 1 mm. long.—Vicinity of *S. sandianum* (author); varies (I think) especially in size of leaves, abundance and length of trichomes, degree of viscidity, size of flowers, these well-developed, showy; cf. the probable extreme in leaf size, *S. probolospermum* Bitter; simulates also *S. glandulosipilosum* Bitter, Repert. Sp. Nov. 11: 213. 1913, of northern Argentina. F.M. Neg. 2613. Section *Dulcamara*.

Huánuco: Yanahuanca, *1213*.—Junín: Near Huancayo, *Weberbauer 6598*, type; *Killip & Smith 23360* (det. Morton). Huariaca, *3089*. La Quinua, 3,400 meters, *Ochoa 336*.

Solanum nigrum L. Sp. Pl. 186. 1753; 50.

Glabrous or somewhat pubescent annual with lax stems and branches sometimes subligneous below; leaves membranous, ovate, 2–several cm. long, entire or more or less repandly serrate; peduncles lateral, usually subracemosely few-flowered, the pedicels 5–10 mm. long; corolla 5.5–7.5 mm. long, white or bluish; anthers 2.1–2.5 mm. long; calyx lobes unevenly joined, little increased in fruit; berry dull black, the many seeds 1.9–2.3 mm. in diameter, stone cells always lacking (Bitter!).—After Stebbins & Paddock, Modroño 10: 79. 1949, who confirmed chromosome count as 2N=72. Apparently the Peruvian plant so named is at least mostly the similar *S. nodiflorum* Jacq. Charles B. Heiser, Jr., Ceiba 4: 293–299. 1955, defined four entities in Costa Rica as pertaining to "the *S. nigrum* L. complex." Should not some geneticist study the plants already represented by many names (74 according to Heiser) before trying even tentatively to interpret the characters? Besides the following there are several collections from the lomas of Arequipa by Günther and Buchtien, according to Bruns. Section *Morella*.

The young shoots contain gluten which is chewed and known as "ckausillo" and is said to be a nerve soporific (Herrera).

Loreto: Lower Río Nanay, *Williams 396*. Caballo-cocha, *Williams 2283*. Pongo de Manseriche, *Mexia 6298* (det. Morton).—Cuzco: Machupicchu, *Mexia 8079* (det. Morton). Santa Ana, *Cook & Gilbert, 515; (Herrera, 162)*. Cosmopolitan. "Yerba-moro" (Ruiz & Pavón), "ccaya-ccaya" (Mexia).

Solanum nodiflorum Jacq. Icones Pl. Rar. 2: 288. 1786; 46. *S. chenopodioides* Lam. Illustr. 2: 18. 1793, in part, fide Stebbins & Paddock. *S. minutibaccatum* Bitter, Repert. Sp. Nov. 10: 549. 1912, at least as to Peru.

A diffuse glabrous or glabrate perennial often with somewhat angulate stems and repand dentate leaves; flowers subumbellate, small but variable in length as filaments and anthers, the latter 1.5–2.4 mm. long; calyx lobes all distinct, reflexing after anthesis and below the lustrous black berry, this usually without stone granules (Bitter) or only 1–4; seeds 1.2–1.8 mm. long.—After Stebbins & Paddock, Modroño 10: 77. 1949, who noted the chromosome number as 2N=24, the species, as *S. nigrum* L., highly variable; type from the island of Mauritius. Most of the specimens cited were distributed as *S. nigrum* L. including one in Madrid without locality by Ruiz and Pavón. F.M. Neg. 33098 (*Jelski 49*, sp. ined., Bitter). Section *Morella*.

Piura: Parinas Valley, *Haught 138*.—Cajamarca: Tambillo, *Jelski 49*.—San Martín: Tarapoto, *Williams 6050*. San Roque, *Williams 7221; 7744*. Juan Guerra, *Williams 6861*.—Lima: Río Chillón, *Pennell 14460*. Santa Clara, *Rose 18741*. Miraflores, *Vargas 1231*. Callao, *Wilkes Exped.*—Huánuco: Santa María, *Allard 22459; 22042* (distr. as *S. minutibaccatum*).—Junín: Chanchamayo, *Ochoa 639*. La Merced, *5297; Killip & Smith 23424; 24058*. Tarma, *Killip & Smith 21862*. Río Perené, *Killip & Smith 25218*.—Loreto: Río Nanay, *Williams 338*. Pongo de Manseriche, *Mexia 6298*. Iquitos, *Williams 7928*. Santa Rosa, *Killip & Smith 28827*. Yurimaguas, *Williams 4153*.—Ayacucho: Kimpitiriki, *Killip & Smith 22970*.—Apurímac: Prov. Abancay, *Goodspeed Exped. 10576*. Tropics generally and widely distributed as a weed elsewhere. "Yerba-moro," "ccyaya-ccyaya" (Herrera), "ayac-mullaca," "aji."

Solanum pallidum Rusby, Mem. Torrey Bot. Club 4: 228. 1895. *S. planifurcum* Bitter, Repert. Sp. Nov. 11: 2. 1912.

Type a loose shrub (1 meter), usually a half shrub, rather densely pubescent, with forked pseudo-stellate trichomes; petioles about 1 (–2)

cm. long; leaves alternate or paired, scarcely undulate, ovate-oblong, 5–10 cm. long, 3–7 cm. wide, but often much smaller, sometimes larger, at the base abruptly, toward the apex gradually attenuate; peduncles lateral, 1.5–2.5 cm. long or longer, 1–3-forked, few- to many-flowered; pedicels 5–10 mm. long; calyx lobes ovate-lanceolate, 0.6–2 mm. long; corolla pale lilac, the lanceolate lobes 5–7 mm. long; anthers 4.5 mm. long, dehiscence soon lateral, filaments pubescent within as style below; berry 8 mm. in diameter.—Varies in leaf size and degree of pubescence, this slightly viscid especially in the inflorescence; some forms suggest *S. juninense* Bitter with different indument; apparently *S. planifurcum* is only a small-leaved more pubescent state. Bitter found 8 stone cells in *S. planifurcum*, 18 in *S. pallidum*. Section *Morella*.

Ayacucho: Pampalca, *Killip & Smith 22243*.—Apurímac: Ampay, *Vargas 777* (det. Standley).—Cuzco: Paucartambo, *Balls 6782; 6783* (det. Morton, *S. planifurcum*); *Pennell 13795* (det. Standley). Cerro de Cusilluyoc, *Pennell 13950; 14147*. Near Marcapata, *Metcalf 30725* (det. Killip, *S. planifurcum*).—Puno: Sandía, *Weberbauer 685* (type, *S. planifurcum*). Yunguyo, *Soukup 589*. Near Limbani, *Metcalf 30431* (det. Killip). Bolivia. "Achihuay" (Vargas).

Solanum Pentlandi Dunal in DC. Prodr. 13, pt. 1: 51. 1852.

Stems dichotomous, slightly angulate-winged, pubescent above; leaves cuneate at base, ovate-lanceolate, acuminate, somewhat angulate-repand, about 5 cm. long, pilose-scabrous above, subhirsute on the nerves beneath; petioles 4–6 mm. long; peduncles and pedicels filiform, like the calyces hirsute-pubescent; racemes furcate, branches subumbellate, about 2.5 cm. long; pedicels 4–6 mm. long, umbellate; calyx lobes ovate, acute; corolla stellate, 2–3 times longer than the calyx, puberulent without, lobes ovate-lanceolate, acute; style elongate, in type at least twice as long as anthers, deflexed at apex.—A variant by Dunal in his synonymy of *S. furcatum*.

Lima: Chicla, *Ball?* (also in Herb. Jussieu without data). Bolivia.

Solanum probolospermum Bitter, Bot. Jahrb. 54, Beibl. 119: 10. 1916.

A somewhat sordid- or yellowish-villous hollow-stemmed (simple trichomes very unequal, multi-celled) half shrub with divaricate scandent angled branches; petioles 1.5–3 cm. long, winged above by the decurrent leaf-blades; leaves ovate, acute or acuminate, about 1–1.5 dm. long and 6.5–8.5 cm. broad, mostly membranous, mostly sub-

repand, densely pubescent on the prominent veins beneath; corymbs (type) at first terminal, many (60–70) (or few?) -flowered; peduncles about 6 cm. long, much forked; pedicels incrassate apically, about 1 cm. long, in fruit 1.5 cm. long; calyx campanulate, 5 mm. long, 6–7 mm. across, the lobes lanceolate, acute (ovate, acuminate, *West*), shortly stipitate glandular within, 4 mm. long; corolla violet, 2–2.3 cm. wide, rotate-stellate, the subtriangular lobes about 7 mm. long, pubescent with simple trichomes without, shortly so within only on midnerve and toward apex; stamens affixed about 1.5 mm. above base, filaments pubescent, 2 mm. long; anthers 3.7 mm. long, cordate-ellipsoid; ovary glabrous; style 8 mm. long, pubescent toward base, stigma subglobose; berry about 1 cm. thick; seeds 60–65, reticulate, tailed at base with a process 2–2.5 mm. long.—Belongs equally to the Morellae and Dulcamarae of Dunal (author); may prove to be a luxuriant state (due to montaña habitat) of *S. juninense;* a Pincos specimen, bifid peduncle, few larger flowers but young, may not belong here at all; *West 8031* has lanceolate acuminate calyx lobes. Section *Morella.*

A tea prepared from the leaves is taken for flatulency (Weberbauer).

Huánuco: Valley of the Río Pozuzo, 3,400 meters, *Weberbauer 6789,* type. Tambo de Vaca, *4439.*—Ayacucho: Near Huanta, 3,200 meters, *Weberbauer 7516a; 7517.*—Cuzco: In dense brush-forest, Río Urubamba, La Maquina, *West 8031.* "Shopta."

Solanum sandianum Bitter, Bot. Jahrb. 50, Beibl. 111: 62. 1913.

A sparsely pubescent shrub, the type nearly a meter high; trichomes branched, mostly on the leaves beneath and these often confined to the veins; petioles 8–17 mm. long; leaves ovate or elliptic, 5–6.5 cm. long, 2–2.5 cm. wide, scarcely undulate, the lower apically rounded and obtuse, the upper gradually narrowed and subacute; peduncles at first terminal, 1.5–4.5 cm. long, forked, 6–11-flowered; pedicels articulate a little above the base, about 12 (after anthesis 15) mm. long; calyx 5–6 mm. across, the 5 or 6 lobes lanceolate, about 2 mm. long; corolla violet, rotate, about 2 cm. broad, the broad (7 mm. at base) lobes to 8 mm. long; filaments 2 mm. long, pubescent on the inner side, anthers early 2-pored, elliptic, 4 mm. long; style 7 mm. long, pubescent below, the stigma capitate; pedicels and calyces more or less suffused (in type) with purple; fruit unknown.—May be an eglandular state of *S. juninense* Bitter; the type is soon glabrate

but other specimens referred to it suggest *S. pallidum* or *S. planifurcum* except for form of leaves. F.M. Neg. 2636. Section *Dulcamara.*

Cuzco: Limatambo, *Vargas 742.* Near Cuzco, *Herrera 819* (det. Morton). Saxaihuamán, *Herrera 2178; 3092* (det. Morton).—Puno: Above Cuyocuyo, *Weberbauer 930,* type. "Chinchi-chinchi" (Herrera).

Solanum sarachoides Sendt. in Mart. Fl. Bras. 10: 18, *pl. 1.* 1846; 62.

Villous angulate-stemmed annual, the unequal many-celled trichomes typically glandular at least above or in the shortly (3–6 mm. long) pedunculate 3–8-flowered inflorescence; leaves ovate, subcordate to abruptly contracted at base, attenuate to obtuse (type) apex, 4–5-repand, subentire, often to 5 or 6 cm. long, nearly as wide or larger; flowers 2–8, subumbellate; pedicels nutant or deflexed, finally 6–10 mm. long, strongly incrassate apically; calyx about 4 mm., in fruit 7 mm. broad, the oblong lobes then 4 mm. long; corolla rotate, 5–7 mm. across, lobes 4–5 mm. long; anthers about 2 mm. long; filaments (anther pores large, introrse) and style pubescent, stigma clavate; berry greenish, globose, opaque (type), about 6 mm. in diameter, about 45-seeded, 4–6 granules.—In part after Bitter, Repert. Sp. Nov. 11: 208. 1913, who limited his detailed description to the type and one other specimen. Similar, and also to be expected (as an introduction from Europe), is *S. villosum* Mill., 58, with often fewer flowers, pedicels and calyx slightly enlarged in fruit, this ripening yellow or reddish. Marked by viscosity and enlarged calyx; the Peruvian plant, immature, may be the plant of Miller; it was collected in weedy growth near river.

Apurímac: Casinchihua, Prov. Abancay, *Goodspeed Exped. 10548* (*10584*). Brazil and widely distributed or established.

Solanum sinuatiexcisum Bitter, Repert. Sp. Nov. 10: 558. 1912. *S. hyoscymoides* Bitter, l.c. 11: 236. 1913.

Somewhat glandular pilose (trichomes simple, spreading) half-shrub often a meter or more high; petioles often 4–6 cm. long or longer, the upper usually geminate; leaves membranous, more or less repand-lobate, rather abruptly contracted at base, attenuately acuminate, ordinarily 8–15 cm. long, somewhat more than half as broad, in age the indument confined to veins; inflorescence lateral, extra-axillary or subopposite leaves, mostly 5–7-flowered; peduncles 2–4 cm. long; pedicels subumbellate in flower, about 1 cm. long,

nutant; calyx campanulate, the lanceolate acute lobes unequal, about 4–7 mm. long; corolla rotate-campanulate, lilac or violet, 10–13 mm. long, pilosulous, the lobes scarcely evident; filaments 1.5–2 mm. long, anthers 4–5 mm. long, dehiscent by subapical chinks; stigma capitate.—Corolla pale violet; in clearing border of the camino (Vargas); identity not certain to me as the corollas seen seem to have longer lobes than described. The author himself suggested that his names may represent one entity, the leaves of the later (1913) one more nearly entire. Very possibly this will prove to be *S. probolospermum* Bitter but fruit unknown; the author separated this from *Morella* as Section *Campulisolanum* Bitter, l.c. 11: 234, characterized (if at all effectively) by the campanulate corolla; in view of the variable corolla shapes from rotate-campanulate to deeply stellate, this at most is a specific identification.

Cuzco: Vilcabamba, 2,550 meters, *Vargas 4016* (det. Killip). Bolivia.

Solanum Zahlbruckneri Bitter, Repert. Sp. Nov. 11: 203. 1912.

Suffrutescent (type), the subobvious decurrent lines of the younger branches, leaves especially beneath and inflorescences rather densely subcanescent with a crispate indument; internodes 1.5–2.5 (–4) cm. long; petioles about 1 cm. long; leaves ovate-lanceolate, entire or obscurely repand angulate, subobtusely acuminate, abruptly or shortly decurrent at base, 4–5 cm. long, 1.5–2.5 cm. wide; peduncles about 1.5 cm. long, in fruit 2–3 cm. long, forked, pedicels finally 7 or 8 mm. long; calyx lobes lanceolate, equal, early 1.5 mm. long, in fruit 2–2.5 mm. long; corolla 12–16 mm. across, the lanceolate lobes violet without, 4 mm. long, 3.5 mm. wide at base, only the interpetiolar tissue glabrous; filaments 1 mm. long, puberulent as style below with long multi-celled trichomes, the style exceeding the elliptic-lanceolate cordate-based anthers by 5–7 mm.; stigma globose, capitate; berry globose, 5 mm. in diameter, perhaps greenish, seeds about 22, 1 mm. long, 1.4 mm. thick, granules none.—After author, who named it for an eminent Austrian botanist; probably genetically a part of *S. furcatum* Dunal and segregates, as *S. arequipense* Bitter, *S. atricoeruleum* Bitter, l.c. 10: 563. 1912, and others of northern Bolivia; some specimens cited under Dunal's name, as my *665, 2966; Soukup 3661*, all from Department Lima as well as several from Puno, as *West 04251, Metcalf 30698*, may, if this is distinct, belong here. F.M. Neg. 33122. Section *Morella*.

Cajamarca: Cutervo, *Jelski 46*, type. Huambos, Prov. Chota, *Soukup 4553*.—Ancash: Recuay, *2514*.

SERIES 3 (Expedient Group)

This vegetative key pertains to species from various groups but brought together conveniently because of the common character of somewhat divided leaves, except *S. phyllanthum* and the tuberiform-rooted *S. montanum*. This arbitrary separation here simplifies considerably the keys in which they would otherwise be distributed or similarly grouped artificially.

Leaves usually at least in part compound (ternate, pinnate, multipinnate, sometimes only more or less divided), the divisions alately joined or if merely repand-lobed always alately decurrent on stems (*S. phyllanthum*) or root tuberous (*S. montanum*); plants various, sometimes elongating, diffuse or semiscandent. Includes in part *Polybotryon, Regmandra, Dulcamara* (cf. *Cyphomandra*, in fruit).

Leaves usually subentire; herb with a fibrous tuberous root; petioles more or less alate but not alately decurrent on stem. *S. montanum.*

Leaves repand-lobulate, rarely subentire, always alate-decurrent on stems; half shrubs in age..... *S. phyllanthum.*

Leaves mostly or all bipinnate or simply pinnate-lobed or -dentate, succulent; flowering as annuals, the base in age subligneous.

Corolla 1–1.5 cm. across, simply 5-lobulate (always?). *S. multifidum.*

Corolla 1.5–2 cm. across, sinuses of lobes minutely lobed. *S. Murphyi.*

Leaves ternate, pinnate or pinnately 3–7-lobed and segments alately joined, often only the terminal; plants subdecumbent, diffuse or scandent.

Leaves pinnately 3–7-lobed, lobes subequal, glabrous; corollas 5–10 mm. long..... *S. radicans, S. quercifolium.*

Leaves compound with 3–many leaflets, rarely 3 terminal joined.

Leaflets 3, rarely 5 on a few leaves; corollas 7–12 mm. long (dubious segregates of *S. ternatum*).

Leaflets oblong-lanceolate, equally narrowed both ends, less than 2 cm. wide..... *S. subquinatum.*

Leaflets ovate-lanceolate to elliptic, oblique at base, mostly at least 2 cm. wide.

Plants glabrous or essentially.....*S. ternatum.*

Plants clearly but often lightly pubescent.

Peduncles solitary; leaves 3 times longer than wide.
S. dendrophilum.

Peduncles geminate; leaves twice as long as wide.
S. semiscandens.

Leaflets regularly 5–many, rarely all, or the terminal 3, alately joined.

Corollas shorter than 1 cm.; leaflets never all joined (the names probably refer to about half as many entities).

Leaflets 5–9, even the terminal at most 2.5 cm. wide, mostly narrower.

Corolla in anthesis 6–8 mm. long; berry subglobose, apiculate; plants scandent.....*S. diffusum.*

Corolla about 3 mm. long; berry conic-acuminate; type decumbent-ascending.....*S. chamaepolybotryon.*

Leaflets 7–many, if narrower than 3 cm., 11 or more; flowers 3–6 mm. long.

Leaflets suboblong, 9 or more.

Leaflets acuminate, often wider than 2 cm., glabrous or midnerve puberulent.

Flowers white, 3 mm. long; berry subglobose.
S. mite.

Flowers lilac, 6 mm. long; berry ellipsoid-conic.

Leaflets glabrous; berry not alate....*S. conicum.*

Leaflets glabrate; berry alate-angled.
S. alatibaccatum.

Leaflets subacute, about 1.5–2 cm. wide, pilose; berry acute both ends.....*S. Uleanum.*

Leaflets rather obovate, subcaudate, more or less pubescent, usually 7.

Flowers greenish-yellow-white; berry globose.
S. huallagense.

Flowers lilac; berry conical.....*S. semievectum.*

Corollas usually at least 1 cm. long; leaves with 3–several often joined segments (cultivated vines, leaves also entire at least in part).

Leaves with a terminal segment much larger than the two lateral.....*S. Dulcamara.*

Leaf-divisions or leaflets about alike.

Calyx repandly lobed.....*S. jasminoides.*

Calyx subtruncate, teeth minute.....*S. Seaforthianum.*

Solanum alatibaccatum Bitter, Repert. Sp. Nov. 12: 68. 1913.

Glabrous or nearly, at least the firm-herbaceous fruiting upper part, this with alternate 4–5-pinnate leaves 2–3 dm. long, the petioles to 4.5 cm. long or longer, shortly petiolulate leaflets oblong-lanceolate or -elliptic, oblique at base, shortly acuminate, lowest to 6 cm. long, a third as wide, upper somewhat larger (in Peru medial to 5 cm. wide, 1.5 dm. long), membranous, pulverulent on midnerve and veins above, glabrous or nearly beneath where clearly puncticulate; inflorescence binate (–3) in axils, 4–7-flowered (type), in fruit 1–1.5 cm. long; pedicels 1 cm. long, incrassate apically; calyx lobes obtuse, 1 mm. long and broad; berry conical, to 22 mm. long, half as thick, prominently alate laterally, the wings subcrenulate, continuous into a compressed beak about 6 mm. long.—Corolla in Peru greenish-white, scarcely 3 mm. long, on pedicels 3.5–4 mm. long. Placed by author in species group *Polybotryon* but allied by him to his *S. theobromyphyllum*, probably correctly; as he suggests, relationship is certainly not indicated necessarily by simple or compound leaves.

Ayacucho: Estrella, 5,000 meters, *Killip & Smith 23055* (det. Killip). Ecuador.

Solanum chamaepolybotryon Bitter, Repert. Sp. Nov. 11: 471. 1912.

Low decumbent-ascending, woody and with roots toward the base, sparsely pubescent or glabrate except petioles, leaf-rachis and midnerve of leaves slightly puberulent; internodes about 3 cm. long; petioles 1.5–3.5 cm. long; leaflets 2 (–3) pairs, lanceolate, attenuate at both ends, the lateral about 3.5–6.5 cm. long, 12–17 mm. wide, the terminal 4–7.5 cm. long, to 1.5 cm. wide, tapering into petioles 3–4 (–10) mm. long; pedicels few–6 mm. long, in fruit 1 cm. long, incrassate apically; calyx 2 mm. broad, very short; corolla lobes about 2.5–3 mm. long; anthers 1.8 mm. long, emarginate both ends; berry (immature) conical, acuminate, 8 mm. long, half as thick.—The leaves are mostly composed of 3 terminal leaflets and only one pair besides;

the small flowers are apparently not fully developed, in which case this may be a young plant of *S. diffusum* R. & P. F.M. Neg. 33057. Section *Polybotryon.*

San Martín: Tarapoto, *Spruce 4432*, type.

Solanum conicum R. & P. Fl. Peruv. 2: 38, *pl. 172.* 1799; 66.

An herbaceous very sparsely pilose-stemmed plant about 8 dm. high; leaflets about 11 pairs, oblong-lanceolate, acute, unequal at base, the larger 8–12 cm. long or little spinulose-pilose above, soon glabrous; peduncles glabrous, axillary, the racemes often bifid or trifid; flowers bluish, 3–4 mm. long, secund, with ovate, acute lobes; berry olive-like, white.—Similar to *S. mite;* stems in type pilose above, angulate; petioles to 7 cm. long; leaves to 2.5 dm. long or longer, with 11 suboblong narrowly acuminate leaflets, these scarcely or not narrowed at the unequal base, the petiolules 2–4 mm. long, the larger blades about 7–10 cm. long, 2.5– nearly 3 cm. wide, the lower 7 cm. long, 2 cm. wide, all glabrous, green above, paler beneath, the 6 or 7 primary veins purplish, little prominent; peduncles 1–3, in fruit stout (1.5–2 mm. thick, 4–6 cm. long, pedicels at least 1 cm. long, apically incrassate), the racemes in flower often 3–5 cm. long, flowers secund; calyx 5-parted; corolla pale blue or lavender, 12 mm. across (Dunal), narrowly ovate segments acute; berry white, conical, the size of an olive (Ruiz & Pavón).—My specimen was single-stemmed, slender, nearly 3 dm. tall, essentially glabrous. Section *Polybotryon.*

Huánuco: Chinchao and Cuchero, *Ruiz*, type. Huacachi near Muña, *4134.*

Solanum dendrophilum Bitter, Repert. Sp. Nov. 12: 143. 1913.

Herb, creeping on trunks, pubescent, with many-celled trichomes; petioles 7–10 cm. long; leaflets 3 (rarely 5), broadly lanceolate, the terminal attenuate at both ends, the lateral very oblique at base, 6–7 cm. long, 2.3–2.5 cm. wide, the petiolule 3–4 mm. long, the terminal larger, all membranous; calyx 5 mm. broad, the lobes very short; flowers purple, to 23 mm. across, the lobes 11–12 mm. long; pedicels 1.5–2 cm. long, crowded, subsessile at the top of solitary axillary peduncles, these about 3.5 cm. long; anthers 6 mm. long, 1.5 mm. thick, only subemarginate both ends; ovary conical, glabrous as the 6–7 mm. long style, the stigma clavate. Section *Polybotryon.*

San Martín: Campana, (*Spruce 4385*, type, Herb. Kew).

Solanum diffusum R. & P. Fl. Peruv. 2: 37, *pl. 171*. 1799; 67. *S. Feddei* Bitter, Repert. Sp. Nov. 12: 67. 1913, fide author.

Suffrutescent with virgate and diffuse or scandent branches; leaflets (2) 3–4 pairs, thick, glabrous or nearly so, oblong-elliptic, acuminate, the larger lateral 3–4 cm. long and 12–15 mm. wide; leaves to 1 dm. long, petioles (2–4 cm.) and rachis more or less pilose as also peduncles, these 2 cm. long with several (–10) violet (sometimes white) flowers 6–8 mm. long on pedicels 5 mm. long, to 1.5 cm. in fruit; calyx crenately lobed, 4.5 mm. across, in var. subtruncate and teeth joined by a membrane; filaments obscure, glabrous as ovary and style, this 6.5 mm. long (var.), the stigma little enlarged; berry subglobose, apiculate (my collection).—The var. *miozygum* (Bitter) Macbr. Field Mus. Bot. 8: 111. 1930 (subsp. *miozygum* Bitter, Bot. Jahrb. 54, Beibl. 119: 14. 1917) is less pubescent, leaflets 2–3 pairs, calyx nearly truncate. Subgenus *Bassovia*, according to Bitter, l.c. 17: 331. 1921, as also *S. conicum* R. & P. Section *Polybotryon*. F.M. Neg. 12996.

San Martín: Jepelacio, *Klug 3665* (det. Standley).—Huánuco: Huacachi, near Muña, *4698*. Prov. of Huánuco, *Ruiz & Pavón*, type. Muña, (*Pearce 135*, type, *S. Feddei*, fide Bitter, l.c. 143). Valley of Río Pozuzo, *Weberbauer 6783*, type, var.).—Junín: Pichis Trail, Dos de Mayo, *Killip & Smith 25811* (det. Morton).—Cuzco: Pillahuata, *Pennell 14012*.

Solanum Dulcamara L. Sp. Pl. 1: 264. 1753; 78.

Flexuose-stemmed vine, the leaves cordate-ovate or the upper often 3-divided, the middle segment broadly ovate, much longer than the unevenly oblong lateral segments; flowers 12 mm. across, the petals 10-spotted; calyx with obtuse lobes; berry ovoid or ellipsoid, more than 1 cm. in diameter when red.—Variable; probably grown for ornament. Section *Dulcamara*.

Loreto: Iquitos, *Williams 8241* (perhaps; in fruit). Old World. "Asnapanga."

Solanum huallagense Bitter, Repert. Sp. Nov. 12: 138. 1913.

Stem 1 meter or so high, subligneous below; rather densely but finely pilose all over except in type, pubescence on the leaves beneath confined to veins; leaflets 3–4 pairs (rarely 2), broadly obovate-lanceolate, about 11 or 12 cm. long and 4–6 cm. wide, or the terminal sometimes 14 × 7 cm.; flowers small, yellowish-green, often 20–25 in a binate or ternate axillary inflorescence; peduncle about 1 (–4) cm.

long; pedicels 2–4 mm. long; calyx 1.5–2.5 mm. wide; corolla 4–5 mm. across, the lobes broadly lanceolate, 2.5 mm. long; anthers ellipsoid, 1–2 mm. long; style 3 mm. long, clearly incrassate to capitate stigma; berry globose, 7–8 mm. long and thick.—Near *S. trizygum* Bitter, l.c. 11: 470. 1913, of Venezuela, a less pubescent plant with smaller leaves, fewer flowers, cordate anthers and conical fruit (author). Some of the San Martín specimens are rather densely pilose, suggesting *S. dendrophilum* or *S. Uleanum*, the latter typically with much smaller and more numerous leaflets, the former with fewer, and, ex char., not obovate. F.M. Neg. 33079. Section *Polybotryon*.

San Martín: San Roque, *Williams 6956*. Tarapoto, *Williams 6045*. Jepelacio, *Klug 3686* (det. Standley, *S. Uleanum*).—Loreto: Yurimaguas, *Spruce 3882*, type; *Williams 4264; 5351; Killip & Smith 27614*. Santa Rosa, *Williams 4905*. Balsapuerto, *Klug 2872* (det. Standley, *S. Uleanum*). La Victoria, *Williams 2829; 2923*. "Sapote yacu" (Williams).

Solanum jasminoides Paxton in Paxt. Mag. 8: *pl. 5*. 1841; 82.

Many-stemmed, twining, glabrous (except young branches and pedicels), the leaves subcordate, ovate, acute or acuminate, mostly entire or 2–5 divided or pinnately parted, the suboblong divisions subobtuse, ordinarily several cm. long, about a third as wide; petioles sometimes strongly curved at base, even clasping adjacent stems, 6–14 mm. long; racemes in terminal or lateral dichotomous panicles; peduncles and pedicels pilosulous, the latter about 10 mm. long, often arcuate; calyx green, to 4 mm. across, the broadly ovate subciliate teeth acute, spreading; corolla pale blue or white, to 2 cm. broad, spreading, deeply divided, the 5 ovate segments acute, 6 or 7 mm. long, nearly half as wide; stamens 4 mm. long; anthers connivent in a tube, pores obovate; ovary and style whitish, the latter often somewhat villous, 6 mm. long.—Crovetto, Rev. Invest. Argent. Agric. 2: 188, has illustrated the similar (or probably merely a form) *S. boerhaaviaefolium* Sendt. treated as a variety by Kuntze, Rev. Gen. Pl. 3, 2: 226. 1898. As Dr. Crovetto remarks, the relationship of the plants must await critical studies. Similar species perhaps grown for ornament include *S. Dulcamara* L. and *S. Seaforthianum* Andrews; the first has terminal leaflet much the largest, corolla 12 mm. across, calyx lobed, fruit oblong-ovoid, the second the leaflets subequal, corolla 2–2.5 cm. across, calyx teeth minute, berry subglobose. Illustrated, Bot. Reg. *pl. 33;* Crovetto, l.c. 189; Journ. Linn. Soc. Bot. 9: 43 (petiole around stick).

Loreto: Río Itaya, *Williams 3382.* Southern South America. "Jasmin."

Solanum mite R. & P. Fl. Peruv. 2: 38, *pl. 175.* 1799; 66.

A tall essentially erect or semi-erect glabrous herb; leaflets 4–5 pairs, oblong-lanceolate-acuminate, very oblique at base, petiolate (petiolules 6–15 mm. long), mostly 7–10 cm. long, 2.5–3 cm. wide; racemes short, clustered in the axils, about 1–3 cm. long; pedicels filiform, incrassate at apex, recurving, secund, calyx minute, 5-parted, the teeth round-ovate, subacute; corolla white or nearly, almost 2 mm. long, 4–6 mm. across, the lanceolate segments acute; stamens half as long as the corolla, subsessile, the stout anthers connivent, 1–1.5 or scarcely 2 mm. long, dehiscing by two apical chinks; style subulate, 1–1.5 mm. long, papillose, deflexed above, obscurely punctulate, the small obconic stigma subemarginate; berry white, subglobose.—Belongs to the subgenus *Bassovia* according to Bitter, Repert. Sp. Nov. 17: 331. 1921; the Killip and Smith material from erect herbs 1–3 meters high. Perhaps should not be restricted so narrowly; Bitter proposed a subspecies *hexazygum,* Repert. Sp. Nov. 11: 10, 19. 1912, glabrous, 4 pairs of leaflets, anthers nearly 2 mm. long, style 3.5 mm. long; there are doubtless fewer genetic species; several names probably will be found to represent individuals only. Section *Polybotryon.* F.M. Neg. 2625.

San Martín: Tarapoto, *Williams 6045.* Juanjuí, *Klug 4252* (det. Standley). San Roque, *Williams 7035.*—Huánuco: Tingo Mariá, *Allard 22193* (det. Lyman Smith); *Stork & Horton 9536* (det. Standley); *Ferreyra 880; 1575* (det. Morton); *Soukup 2210* (det. Killip). Cayumba, *Mexia 8326A.* Pozuzo, *4676.* Tulumayo, *Ferreyra 2138* (det. Morton).—Junín: Chanchamayo, *Isern 2241.* Pichis Trail, *Killip & Smith 26140* (det. Morton). Near Perené Bridge, *Killip & Smith 25331.* La Merced, *5267; Killip & Smith 23561; 24066.*—Loreto: Yurimaguas, *Killip & Smith 27614; 28108* (all det. Morton, *S. semievectum*); *Williams 4264; 5351.*

Solanum montanum L. Sp. Pl. ed. 2, 1: 336. 1763; 61. *S. tuberiferum* Dunal in DC. Prodr. 13: 63. 1852. *S. tuberiferum* Dunal, var. *avenarium* Dunal, l.c.

Low ascending-erect herb from a shallow set subglobose tuber bearing many fibrous roots; indument sparse, evanescent, spiculose, mostly persisting only on the bracted or ebracteolate sometimes furcate few-flowered inflorescences; petioles usually or all well-

defined, often elongating to several cm., narrowly alate toward apex by the more or less decurrent (basally long-attenuate) leaf-base, commonly more or less amplexicaul but not decurrent on the weak stems, entire to repand-dentate or lobulate; leaves ovate-subrotund, ordinarily 5 or 6 cm. long, at least half as wide (–3), peduncles to 1 dm. long, pedicels about 1.5 cm. long, nearly filiform; calyx lobes suboblong-obovate, unequal or equal, subobtuse, partly enclosing the pale berry, scarcely 5 mm. long; corolla white or violet, rotate-substellate, about 1 cm. long, nearly as broad at top; anthers oblong-ellipsoid, 4 mm. long, more or less exceeded by the style, the stigma conical; berry about 5 mm. in diameter.—Dunal's plant was characterized by a shallow corolla finally opening stellate, the variety particularly by the presence of bracts, apparently intangible characters in this instance; his diagnosis of the Linnaean plant seems to be after the plate of Feuillée in the latter's work, *pl. 46.* 1766, and his variety on *plate 160* of Ruiz and Pavón (2: 32); Bitter proposed in herb. several under-species names. Variable in foliage, the key character even may not be constant and indeed some young specimens, as my *5860* and *5864*, could be this species; cf. in this connection *S. phyllanthum* Cav. *S. montanum* L. however is at least characteristically a loma species. F.M. Negs. 2645; 8592; 33119. Section *Regmandra.*

Ancash: Lomas de Monzón, *Goodspeed Exped. 9165; 9166* (det. Johnston).—Lima: Chorillos, *5860; Weberbauer 5687.* Near Lima, *Wawra; Feuillée,* type. Prov. Lima and Chancay, *Ruiz & Pavón* (type, *S. tuberiferum* et var.); *Weberbauer 7486b; Goodspeed Exped. 9098; 9100; 9238; 04013; 8099a* (all det. Johnston). Mount St. Augustín, *Weberbauer 5224.* Atocongo, *Pennell 14785.*—Arequipa: Mollendo, *Weberbauer 1454; 1577.* Near Chala, *Goodspeed Exped. 15609* (det. Johnston). "Papas de lomas," "papas de montana."

Solanum multifidum Lam. Illus. 2: 17. 1793; 66. *S. multifidum* R. & P. Fl. Peruv. 2: 37, *pl. 17, fig. a.* 1799. *Witheringia multifida* (R. & P.) Dunal, Syn. Sol. 3. 1816. *S. pinnatifidum* R. & P. l.c. *pl. 170, fig. b. W. pinnatifida* (R. & P.) Dunal, l.c. 2. *S. senecioides* Dombey ex Dunal in DC. Prodr. 13: 65. 1852. *S. Tafallae* Macbr. Field Mus. Bot. 8: 111. 1930 (*S. multifidum* R. & P. l.c. not Lam. Illus. l.c.). *S. callianthemum* Bitter, ined.

Succulent herb, glabrous or obscurely evanescently pilosulous, flowering as a slender annual with fibrous root, soon densely leafy, the root and base becoming stout and stems more or less broadly

alate by the mostly bipinnatifid leaves, these to 2 dm. long, about half as wide, the ultimate divisions obtuse; in age stems more or less tufted, cicatricose and subligneous; racemes terminal, 2–6 cm. long, simple, 2–3-branched or corymbose, the peduncles exceeding the foliage and sometimes naked, sometimes with an entire or a pinnately lobed bract, even on the same plant; pedicels capillary, 1–2 cm. long; calyx lobes suboblong, obtuse or subacute, 2 mm. long; corolla blue, somewhat angulate, 1–scarcely 1.5 cm. broad; anthers exceeded by style, yellowish, to 4 mm. long, dehiscence lateral; fruit pale yellow on arcuate or recurved pedicels, 5 mm. in diameter; stone cells not found by Bitter in this and related species, except perhaps *S. phyllanthum* Cav.—Dunal remarked that in spite of confusion in application of names he thought three distinct species were concerned (he saw only four specimens); he stressed presence or absence of bract on peduncle, this sometimes remotely glandular-verruculose, development of inflorescence and other mostly vegetative characters; the Arequipa form may be varietal, the corolla larger (not always), the peduncles obscurely lineately glandular(?).

S. pinnatifidum Lam. Illus. *pl. 115, f. 4.* 1793 (*S. runcinatum* L'Hér. ex Dunal, 68) with fibrous roots was *S. pinnatum* Cav. according to Bitter in Herb. Dahlem; it is said also to include *S. Feuillei* Dunal, l.c. 70, also of Chile, the root developed as stout, fleshy; *S. pinnatum* Cav. with simply pinnate leaves is unknown in Peru unless in hort. Bruns referred *Günther & Buchtien 107* and *107a* (not seen) from Mejia and Cachendo, Arequipa, to the Chilean *S. Remeyanum* Phil., Cat. Pl. Itin. Tarapaca 66. 1891, with puberulent corollas 8–9 mm. long; the determination is doubtful. A beautiful plant, characteristic of the dryer seaward slopes of sandy lomas. F.M. Negs. 29724; 6747 (type, *S. senecioides*); 2599 (*Weberbauer 1458*). Section *Regmandra.*

Ancash: Lomas de Monzón, *Goodspeed 9182.*—Lima: Chancay, *Dombey,* type. Lima and Chancay, *Ruiz & Pavón* (type, *S. pinnatifidum*). Pasomayo, *Stork & Vargas 9343* (det. Johnston). Mt. San Augustín, *Weberbauer 5239; Asplund 13790.* Chorillos, *Weberbauer 5691.* Lurín, *5928.* Lomas de Pasomayo, *Vargas 1239.* Lomas de Lachay, *Soukup 1851.* Near Lima, *Rose 18561; 18583; Gaudichaud.*—Arequipa: Mollendo, *Worth & Morrison 15731; 15753* (det. Johnston); *Guenther; Weberbauer 1458* (type, *S. callianthemum*); *1572.* Lomas de Checa, *Raimondi.* Pongo, Prov. Camaná, *Tafalla* (type, *S. multifidum* R. & P.).—Tacna: Near Tacna, *Werdermann 724.*

Solanum Murphyi Johnst. Contr. Gray Herb. 95: 34. 1931.

Glabrous (except corolla), succulent, erect, 1.5–3 dm. tall, subdichotomously branched, the usually simple branches to 12 cm. long; ovate or ovate-oblong leaves 1.5–2.5 cm. long, 5–8 mm. wide, abruptly contracted to alate petiole, 5–7-lobed, the lobes obtusely 2–3-pinnate, the margins evidently revolute; inflorescence 1–2-flowered, often terminal on the branches, pedicels slender, 5–9 mm. long, reflexed in fruit; calyx 4–4.5 mm. long, the 5 oblong obtuse lobes erect, 3–3.5 mm. long, 1–1.5 mm. wide, stipitate-glandular within; corolla purple-blue, cupuliform or rotate-infundibuliform, 1.5–2 cm. across, about 12 mm. long, villosulous only without, the rounded apiculate lobes about 8 mm. broad, 1.5 mm. long with rounded lobules about 2 mm. wide, 0.9 mm. long in the sinuses; filaments 4 mm. above base, anthers equal, oblong, 2–2.5 mm. long, bipored; style 5.5 mm. long, stigmas compressed; fruit globose, diameter 5–7 mm.—Seems to be related to the Chilean *S. Feuillei* Dunal (*S. pinnatum* Cav.). According to Bitter, species apparently without intermediate lobules in corolla sinuses. A distinct species or a variant may be represented by *Weberbauer 7960*, the leaves simply pinnate, the small lobules entire. Illustrated, Johnst. l.c. *pl. 7* (photo).

This pretty plant, specifically distinct or not, recalls to botanists the ornithologist Robert Cushman Murphy, whose consciousness of all nature is so pleasantly apparent in his "The Bird Islands of Peru" (Putnam, 1925).

Ica: Among rocks, foggy summit, Viejas Island, (*Murphy 3219*, type). Near crest of San Gallen, (*Murphy 3479*). Bahia de la Independencia, 500 meters, *Weberbauer 7960?*

Solanum phyllanthum Cav. Icones 4: 35, *pl. 359*. 1797; 63. *Witheringia phyllantha* (Cav.) Dunal, Syn. Sol. 2. 1816. *S. rhopalostigma* Bitter, Abhandl. Nat. Verh. Bremen 23: 148. 1914, form.

A low (vigorous plants sometimes about 1 meter long) at first often somewhat ashy pubescent herb, persisting and becoming a half-shrub, the ovate-rhombic to suboblong entire to sinuately lobed leaves decurrent at base into the winged petioles and stems; leaves, including the ordinarily scarcely defined petiole, usually 5–8 (11.5) cm. long, about a third as wide; racemes few–many-flowered, dichotomous, seemingly terminal, the wing-based subtending leaf often entire; flowers light purple or mauve, rarely white, 1–2 cm. wide; pedicels flexuose or arcuate, 1–2 cm. long; calyx cyathiform, seg-

ments oblong, subobtuse, 5 mm. long, with somewhat rounded membranous sinus in fruit; corolla plicate, spreading, angulate, 1–1.5 (2) cm. across; anthers yellow, early bipored, promptly laterally dehiscent, well-exceeded by style, the stigma more conical; berry whitish or reddish, finally about 1 cm. in diameter, subapical stone cells 2 (*Weberbauer 1554*, fide Bitter).—Variable, especially in foliage, degree and permanence of the simple indument, size of flowers. An attractive flower in March and April, mostly on rocky slopes; applied to wounds (Hinkley). Bitter has proposed, in herb., two segregate species. Glabrate forms and young plants readily confused with *S. montanum* (*S. tuberiferum*) with which it sometimes grows and perhaps some undeveloped specimens referred here on key character without roots may belong actually to *S. montanum*. The southern state is often more puberulent but not always, my *331* and *Munz 15517* being similar. F.M. Negs. 2634; 5317 (both Weberbauer with ined. names). Section *Regmandra*.

Lima: Lomas, Pasomayo, *Vargas 1227*. Provinces of Lima, Chancay and Lurín, *Ruiz & Pavón*, type. Matucana, *331; Weberbauer 5252*. Chosica, *Weberbauer 5317* (form). Pachacamac, *Mexia 04054* (det. Johnston, *S. tuberiferum*). Huarochiri, *Goodspeed 33111* (det. Killip, *S. tuberiferum*). Atocongo, *Ferreyra 3891* (det. L. B. Smith, *S. tuberiferum*).—Arequipa: Quequena, *Eyerdam & Beetle 22174*. Mollendo, *Hitchcock 22374*. Chachani Mt., *Hinkley 9*. Arequipa, *Pennell 13049; 12343; Rose 19004; Sandeman 3777; Munz 15517; Seler 213; Balls 5869; 5871*. Yura, *T. D. A. Cockerell*. Along railroad to Puno, *Shepard 249*. Mollendo, *Weberbauer 1554* (type, *S. rhopalostigma*). Near Mejia and Posco, (*Günther & Buchtien 90; 91; 92*).—Tacna: Near Tarma, *Meyen*. Candarave, *Weberbauer 7368; Metcalf 30372*. Chile. "Papa cimarrona" (Balls), "nuccho blanco" (Hinkley).

Solanum quercifolium L. Sp. Pl. 264. 1753; 71. *S. reclinatum* L'Hèr. ex Pers. Syn. 1: 225. 1805?; 68. *S. infundibuliforme* Phil. Anal. Mus. Nat. Chile 65. 1891, as to Peru?

A clambering glabrous or nearly glabrous herb with thickish pinnately mostly (3) 5–7-lobed leaves; lobes ovate-oblong to linear-oblong, entire or the terminal toothed, the sinuses rounded; leaves 5–8 cm. long, decurrent into the petiole; calyx teeth broadly ovate, acute, early 1 mm. long, to 1.5 mm. in fruit; corolla lavender, about 1 cm. long and broader; fruiting pedicels even 1 cm. long.—Has been characterized as having more open pseudo-terminal cymes and

mostly 7 leaf segments in contrast to *S. radicans* L. f., seemingly and probably a fanciful sorting of specimens; here may belong *Günther & Buchtein 102, 102a* and *1401* from Pasco and Mollendo, Arequipa, determination Bruns, *S. infundibuliforme* Phil. l.c. with corolla 2 cm. long (ex. char.). Original by Jussieu from Peru, probably near Lima; in Herb. Willd. ex Thunberg as from Peru; type of *S. reclinatum*, by Dombey, possibly not from Peru, scarcely distinct, the leaf segments linear-oblong; there are similar Bolivian plants, possibly an exaggerated development in shade, terminal leaf lobe to 1 dm. long! F.M. Negs. 2908; 6746 (*S. reclinatum*). Section *Dulcamara*.

Lima: Near Lima, *Soukup 1923* (det. Killip); Matucana, *138; 381* (both det. Johnston).—Huánuco: Near Huánuco, *Stork & Horton 9372* (det. Standley); *Sawada 62*.—Junín: Tarma, *Killip & Smith 21881*.—Loreto: Río Morona, *Dennis 29164* (det. Morton). Paraiso, Río Itaya, *Williams 3382*.—Cuzco: San Geronimo, *Pennell 14205*. Ollantaitambo, *Pennell 13687; Cook & Gilbert 371* (both det. Johnston).—Arequipa: Tingo, *Pennell 13100*.

Solanum radicans L. f. Dec. *pl. 10*. 1762; 71. *S. cymosum* Herrera, Contr. Fl. Dept. Cuzco 2: 168. 1921.

Perhaps differs from *S. quercifolium* L. in having 5 leaf segments, denser pseudo-axillary cymes, much smaller pale purple (or nearly white) flowers (about 5 mm. wide) and narrowly ovate calyx lobes 1.5 mm. long to nearly 3 mm. long in fruit.—Apparent intermediates exist and character appears tenuous. The Hitchcock specimen, "after October rains" has upper leaves about 1 dm. long, corollas nearly 7 mm. long, calyx teeth 2 mm. long. Section *Dulcamara*.

Piura: Huancabamba, (*Bonpland*).—Cajamarca: Cutervo, *Raimondi* (det. Werdermann).—Amazonas: Chachapoyas, *Mathews* (det. Morton).—Lima: Valle de Chillón, *Velarde Nuñez 908* (det. Morton).—Huánuco: *Raimondi* (det. Werdermann).—Junín: Huancayo, *Ledig 35; Soukup 2702* (det. Morton). Tarma, *Killip & Smith 21881*.—Ayacucho: Pomobamba, *Raimondi* (det. Werdermann).—Cuzco: Sicuani, *Cook & Gilbert 88*. Urubamba Valley, *Herrera 1734* (det. Werdermann); (*Herrera*, type, *S. cymosum*).—Arequipa: Yura, *Cockerell*. Mollendo, *Hitchcock 22373*. Chala, *Raimondi* (det. Werdermann). Bolivia, Chile. "Kusmaillu" (Herrera); "cushay," "cuspallo," "cusmayllu" (Cook & Gilbert).

Solanum Seaforthianum Andrews, Bot. Repos. *pl. 504*. 1797–1804; 67.

Glabrous (or nearly), sometimes climbing several meters; petioles 2–3 cm. long, straight or curved; leaves to about 1 dm. long with mostly 5–9 ovate-oblong or subelliptic leaflets, the 3–5 upper often only segments by reason of their basal union, all somewhat acuminate, 3–4 (8) cm. long, the terminal little larger; cymes subterminal, finally lateral, rather few–many-flowered; pedicels slender, incrassate above, 5 or 6 mm. long; calyx narrowed at base with 5 remote minute teeth or these nearly obsolete; corolla stellate, violet or lilac, (1) 2–2.5 cm. across, obscurely or not puberulent; stamens 4 (4.5) mm. long, exceeded by the glabrous style; berry globose, 6–9 mm. in diameter, finally reddish.—Illustrated, Bot. Mag. 45: *pl. 1982.* Section *Polybotryon.*

Loreto: Yurimaguas, *Williams 4323; 4877.* West Indies; northern South America; Mexico.

Solanum semievectum Bitter, Repert. Sp. Nov. 12: 542. 1913.

A nearly glabrous fleshy or hollow-stemmed herb, sparsely pilose only on the leaf rachis and midnerves and at the leaf insertions; petioles about 1.5 cm. long; leaflets 3 pairs, the lower lateral petiolate, the upper subsessile, the former mostly 8.5 × 2.5 cm., the latter 14 × 3.5 cm., the terminal 8.5 × 3.5 to 15 × 5 cm.; half of each inflorescence axillary, the other half borne from about the middle of the slender petioles; flowers and fruit unknown in type.—Unless by the inflorescence apparently the same as *S. conicum* R. & P.; probably the second inflorescence is also axillary from a young leaf, undeveloped or broken off. Section *Polybotryon.* F.M. Neg. 2638.

Huánuco: Muña, *4001.*—Loreto: Yurimaguas, *Poeppig,* type. Puerto Arturo, below Yurimaguas, *Killip & Smith 27760* (det. Morton; det. Standley, *S. mite*).

Solanum semiscandens Bitter, Repert. Sp. Nov. 12: 142. 1913.

Scandent or semiscandent shrub, the younger fistulose stems subfloccose with many-celled hairs; petioles 3.5–4.5 cm. long; leaves ternate, thick, glabrous above, sparsely pubescent beneath; leaflets broadly elliptic or elliptic-lanceolate, the lateral oblique at base, on petiolules 6–8 mm. long, the blades 4.5–5 cm. long, 2.2–3 cm. wide, the terminal 5– nearly 7 cm. long; inflorescence axillary, geminate, the peduncles 5–10 cm. long, the 4–9 apically congested pedicels 1.5–2 cm. long; calyx lobes 1.5 mm. long; flowers lilac or white with purple bases, 1–1.5 cm. broad, the fleshy petals pubescent without, 7 mm. long, 4–5 mm. wide at base; anthers sessile, 6 × 3 mm.; style

6.5 mm. long, papillose only above.—Cf. *S. ternatum.* Section *Polybotryon.*

Huánuco: Muña, trail to Tambo de Vaca, *4279.* Muña, (*Pearce,* type).

Solanum subquinatum Bitter, Repert. Sp. Nov. 12: 144. 1913.

A sparsely pubescent or glabrate herb related to *S. ternatum* R. & P. but the leaflets sometimes five, all lanceolate and attenuate at both ends, the smallest about 1.5 cm., the terminal about 3.5 cm. long; peduncles 4–5 cm. long, with 4–10 flowers at apex on pedicels 1–1.5 cm. long; calyx 6 mm. across, lobes obtuse, obscure; corolla 12 mm. broad, lobes 6 mm. long, 2.5–3.5 wide, scarcely more than papillose pubescent; anthers subsessile, 5 × 2 mm., cordate at base; style 5.5 mm. long, obscurely or not papillose, stigma obtuse; berry (young) subconic.—Corolla pale yellowish-brown, center yellow; leaves dark green, lustrous (Woytkowski). Section *Polybotryon.*

Amazonas: Chachapoyas, (*Mathews,* type, Herb. Kew and Brit. Mus.).—Huánuco: Divisoria, 1,600 meters, *Woytkowski 512* (det. Cuatrecasas, *S. semiscandens*).

Solanum ternatum R. & P. Fl. Peruv. 2: 38, *pl. 172, fig. a.* 1799; 67.

A scandent shrub similar to *S. semiscandens* Bitter but glabrous and leaflets elliptic to oblong-lanceolate, shortly acuminate to subobtuse, rounded to acute at base, the lateral more shortly and obliquely, 5–7 cm. long to about 2 cm. wide; peduncles 1–5 cm. long, the 3–6 subumbellate pedicels often 1 cm. long; calyx 5-crenate; flowers purplish white to purple-violet, about 1 cm. long; berry cherry size, ovoid-conic, whitish.—Leaves soft, fleshy, or little puberulent on veins beneath (Woytkowski). *S. trifolium* Dunal, 68, type by Tafalla from Guayaquil, is distinctive by its subrotund leaflets. F.M. Neg. 2639. Subgenus *Bassovia* Bitter; that is, *Polybotryon.*

Huánuco: Cuchero, *Ruiz & Pavón,* type.—Junín: Agua Dulce, *Woytkowski 35416* (det. Cuatrecasas). Utcuyacu, *Woytkowski 1163* (det. Killip). Colombia.

Solanum Uleanum Bitter, Repert. Sp. Nov. 12: 139, *pl. 1.* 1913. *S. Uleanum* Bitter, var. *unipedunculata* Bitter, l.c. 140.

High-climbing by scattered and fascicled adventitious rootlets; densely pubescent, the trichomes mostly simple; petioles 3.5–5 cm.

long; leaflets 6 (–7) pairs, thin, broadly lanceolate or nearly oblong-lanceolate, subacute, the lowest about 4 cm. long by less than 1.5 cm. wide, the uppermost and terminal about 6 cm. long, 2 cm. wide; peduncles geminate or solitary, axillary, 1–2.5 cm. long; flowers several to two dozen; pedicels often 8 mm. long (15 in fruit); calyx lobes obtuse; corolla white or yellowish, the lobes about 4.5 mm. long; filaments 0.7 mm. long, anthers 1.5–2 mm. long, cordate at base; style 5 mm. long, papillose; berry longer than broad, attenuate both ends, evanescently pubescent.—Var. *gracilescens* Bitter, l.c. 141, is more slender; petioles 1.5–2 cm. long; leaflets only 5 pairs, the smallest about 17 × 8 mm., the terminal about 26 × 8 or 9 mm., all more sparsely pilose; flowers 7–14. Leaves green both sides (type) or in variants purple or violet beneath. F.M. Neg. 3178. Subgenus *Bassovia* according to Bitter, l.c. 17: 331. 1921; that is, *Polybotryon*.

Río Acre: Porto Carlos, (*Ule*). San Francisco, *Ule 9756b*, type; *9756* (type, var. *unipedunculata*).

SERIES 4 (mostly *Leiodendron*, sens. lat.)

Shrubs or small trees, virgate half-shrubs, rarely vines or subscandent, never prickly; leaves entire.—Includes for convenience *S. Miquelii*, and entire-leaved species of *Dulcamara*, entire-leaved species of *Polybotryon*, the trailing *S. oxycoccoides*, the lax *S. chachapoyasense*, the 4-merous *S. cruciferum* (partly at one time *Anthoresis*, later *Anarrichomenum*); it is doubtful if these groups, as well as *Anthoresis*, *Anthopleuris*, *Indubitaria*, for that matter, are natural associations or at any rate helpful classification or identification aids maintained separate from *Leiodendron*. *S. caudatum* is omitted from the key as too imperfectly known.

Inflorescence more or less compound, often early terminal, rarely capitate; species usually somewhat pubescent or defined petioles short or absent (plants allied to *S. acuminatum*, *S. patellare* or forms of these might be sought here; also *S. styracioides*).

Leaves not obovate nor alately long-decurrent, sometimes acute at base; rarely 1.5 dm. long, often much shorter.

Vine, puberulent above; leaves often undulately crisped. *S. styracioides*, *S. Miquelii*.

Shrubs or trees; leaves usually plane.

Leaves rather oblong-lanceolate (sometimes subovate, *S. aureum*); indument beneath often obscure, fulvous, rarely grayish or absent.

Flowers showy, about 2 cm. long.....*S. patulum.*

Flowers much smaller.

Pubescence of leaves distributed, not axillary-tufted.

Leaves not bullate-asperous, sometimes scabrous.

Flowers usually in the acuminate leaves..*S. nitidum.*

Flowers usually above the acute or shortly acuminate leaves.....*S. aureum.*

Leaves strongly asperous or (type) bullate-asperous. *S. selachophyllum.*

Pubescence tufted in nerve axils.....*S. manicatum.*

Leaves rather ovate, canescent-stellate at least beneath.

Calyx subcrenate; leaves bicolor, green but sparsely stellulate above.....*S. salviifolium.*

Calyx lobed; leaves more or less canescent both sides.

Stiped trichomes dominant on younger parts. *S. umbellatum.*

Stiped trichomes not prevalent, at least usually. *S. verbascifolium.*

Leaves somewhat obovate (unless aberrant or allied forms), basally acute or cuneate to alately long-decurrent; often ample, often sessile or subsessile; never much pubescent, mostly glabrous or glabrate (many ambiguous specimens exist, species dubious).

Petioles alate-margined even to base by decurrent suboblong-obovate blades, these often crowded, alternate, (1) 2–3 dm. long.

Leaves usually 3–4 cm. wide, 1–1.5 dm. long; flowers to 1 cm. long, congested.....*S. monadelphum.*

Leaves finally much larger.

Flowers 1–1.5 cm. long; leaves sessile, even clasping. *S. sessile.*

Flowers 5–8 mm. long; leaves subsessile.

Leaves glabrous.....*S. marmellosanum.*

Leaves early scurfy tomentose beneath..*S. oblongifolium.*

Petioles shortly margined or scarcely, typically defined, often geminate; corollas 5–7 mm. long.

Pedicels stout, soon incrassate, 5–10 mm. long. *S. dibrachiatum.*

Pedicels subfiliform, soon about 1 cm. long.....*S. pulchrum.*

Inflorescence simple, axillary, lateral or at branchlet tips, rarely early terminal (sometimes 1-furcate, *S. patellare, S. amotapense, S. luteoalbum*, racemes rarely panicled, *S. acuminatum*).

Erect or suberect often shortly branched shrubs or half-shrubs, densely pubescent; corollas 5 mm. long or longer.

Leaves and branchlet tips sericeous pilose or villous; leaves ovate to elliptic.

Leaves geminate, the smaller stipuliform; trichomes branched. *S. xanthophaeum.*

Leaves alternate, stipuliform often on axils; trichomes simple. *S. chachapoyasense, S. sericeum.*

Leaves at least beneath and branchlets (except var.) more or less arachnoid-lanate-tomentose or leaves oblong-lanceolate (see also third contrast).

Flowers subumbellate, peduncles absent or short, pedicels to 1.5 (–2) cm. long.

Petioles 1–1.5 cm. long or longer.

Calyx lobes low, rounded, firm-margined; indument subpersisting at least on branchlets (except var.). *S. ochrophyllum.*

Calyx lobes about oblong, subobtuse; indument, except inflorescence, soon evanescent.....*S. nutans.*

Petioles 3–5 mm. long; calyx crenate or lobes rounded.

Leaves all or mostly alternate, about 5–7 cm. wide, obtuse; calyx crenate.....*S. chloranthum.*

Leaves geminate, the larger 3–4 cm. wide, acuminate, the smaller stipuliform; calyx lobes rounded...*S. solum.*

Flowers few, in well-peduncled inflorescences.

Leaves ovate.

Leaves tomentose-stellate both sides; calyx deeply parted; tomentose.....*S. luteoalbum* (var.).

Leaves green above, nerves pubescent.

Calyx gibbous, margin denticulate.....*S. amotapense.*

Calyx deeply parted.....*S. Lechleri.*

Leaves oblong-lanceolate.....*S. nitidum* (var.).

Leaves (beneath) and branchlets rarely hispidulous, early scurfy or puberulent, usually soon glabrate or glabrous or indu-

ment localized; corollas 5–10 mm. long (unknown in *S. luteoalbum*).

Leaves at least mostly alternate, subequal and rarely 1 dm. long.

Flowers, except *S. pseudocapsicum*, several, 5-merous; leaves usually 5–10 cm. long.

Leaves about ovate, obtuse or acute, rarely obtusely acuminate.

Calyx lobed or parted.

Leaves rather attenuate to base, obtuse, subobtuse or subobtusely acuminate, usually pubescent in nerve axil...*S. maturecalvans, S. amblophyllum.*

Leaves rounded to acute base, acute; indument, if present, general.....*S. luteoalbum.*

Calyx gibbous below, the margin denticulate. *S. amotapense.*

Leaves oblong-lanceolate, more or less acuminate.

Pedicels 1–3 in each axil.....*S. pseudocapsicum.*

Pedicels racemose.....*S. nitidum.*

Flowers 4-merous, 1–2; leaves 2–4 cm. long..*S. cruciferum.*

Leaves often geminate and more or less unequal, the larger mostly 1–1.5 dm. long, even when alternate.

Leaves ovate- or broadly elliptic, rounded to acute or shortly cuneate at base, little or not narrowed to rounded or cuspidate tip; smaller leaves (if present) more rounded.

Leaves firm to coriaceous, glabrous to evanescently scurfy, geminate.

Corollas rather thin, 6 or 7 mm. long..*S. acuminatum.*

Corollas fleshy, 8–10 mm. long. *S. psidiifolium, S. oblongum.*

Leaves membranous, often puberulent as inflorescence.

Inflorescence racemose, peduncled; leaves in part geminate.....*S. patellare.*

Inflorescence subsessile; leaves often alternate. *S. deflexiflorum.*

Leaves oblong-elliptic, subequally attenuate both ends, often slightly and not or little diverse except in size; corollas 7 or 8 mm. long.....*S. oppositifolium.*

Erect, simple or virgately branched half-shrubs, or sprawling to scandent, rarely trailing perennial, often rooting at lower nodes; corollas 2–3, rarely 4 mm. long (longer in *oxycoccoides*) (cf. *S. deflexiflorum*).

Leaves geminate at least some of the upper, all very unequal, the smaller stipuliform, diverse.

Flowers 2–3 mm. long; leaves not all (rarely none) geminate. *S. loretoanum, S. confine.*

Flowers 4 mm. long; leaves (flowering branchlets) all geminate. *S. anisophyllum.*

Leaves alternate, subequal, not diverse, sometimes large.

Leaves more or less decurrent; stems glabrous or glabrate.

Corolla lobes about 4 mm. long, broadly ovate-oblong to narrowly oblong; berry early long-conic, finally 1 cm. thick..... *S. anceps.*

Corolla lobes 2–3.5 (5) mm. long, oblong or suboblong.

Berry even early not conical; pedicels in flower arcuate, 5–10 mm. long..... *S. robustifrons.*

Berry early conical; pedicels subascending, to 5 mm. long. *S. theobromophyllum, S. angustialatum.*

Leaves not or little decurrent at rounded base, somewhat pubescent both sides.

Flowers 2–3 mm. long; stems stout.... *S. hederiradiculum.*

Flowers 5–6 mm. long; stems slender, trailing. *S. oxycoccoides.*

Solanum acuminatum R. & P. Fl. Peruv. 2: 34, *pl. 159, fig. a.* 1799; 146. *S. hypomicropogon* Bitter, Repert. Sp. Nov. 18: 56. 1922.

A glabrous or glabrate shrub or tree with geminate oblong-elliptic or ovate abruptly cuspidate-caudate leaves, somewhat unequal in size, the larger to 1.5 dm. long, the smaller of each pair about 8 cm. long or longer, lustrous above, reticulate-venose beneath, the 7 or 8 lateral nerves there prominent; petioles 10–12 mm. long; racemes nearly opposite the leaves, simple; peduncle (rachis) cicatrose to 1 cm. above base, becoming 4–5 cm. long; flowers many, secund, in two alternate series, the slender pedicels 1–1.5 (2) cm. long; calyx cyathiform, broadly ovate lobes subacute or apiculate; corolla in type white, about 12 mm. across, the subacute cucullate elliptic-oblong lobes to 7 mm. long; anthers obovate, the cells gibbously thickened,

to 4 mm. long; filaments 1 mm. long; style 5– nearly 5.5 mm. long; berry (Williams) nearly 1 cm. in diameter.—Sometimes a few trichomes are in the nerve-axils of leaves beneath; doubtfully distinct from *S. oblongum* R. & P. Cuzco and Puno specimens had pale to dark purple flowers, leaf-nerves in latter more prominent, at least a variant but probably nearer *S. oblongum* R. & P. than *S. Warmingii* Hiern. Bitter's proposed species was based on tree (10 meters) with more acuminate leaves, more open inflorescence, larger flowers in contrast to *S. oblongum;* these characters, developed in degree, suggest that a single species may in fact be concerned. *S. triste* Jacq. Stirp. Amer. 50. *pl. 40.* 1780, to which a Poeppig specimen was referred in several herbaria presumably belongs here or to *S. oblongum* R. & P., scarcely the same as Jacquin's plant of the Caribbean. An open shrub or small tree. Illustrated, Mart. Fl. Bras. 10: *pl. 2, figs. 20–25.* Section *Leiodendron.* F.M. Negs. 2594; 2610.

Tumbez: Region del Caucho, *Velarde Nuñez 355* (det. Morton with query).—Cajamarca: Prov. Hualgayoc, *Soukup 3882.*—San Martín: Lamas, *Williams 6352.* Tarapoto, *Williams 5450.*—Huánuco: Cueva Grande, Near Pozuzo, *4794.* Muña, *4027; 4155.* Chinchao, *Ruiz & Pavón,* type.—Junín: Merced, (*Weberbauer 1876,* type, *S. hypomicropogon*).—Loreto: Yurimaguas, *Poeppig 2279* (distr. as *S. triste* Jacq.). Near Iquitos, *Williams 8242.* Masisea, *Killip & Smith 26863* (det. Morton, *S. hypomicropogon*).—Cuzco: Pillahuata, *Pennell 13951.*—Puno: Santa Domingo to Chabuca.

Solanum amblophyllum Hook. Bot. Misc. 2: 231. 1831; 157. *S. hypostichopogon* Bitter, Repert. Sp. Nov. 16: 95. 1920. *S. barbulatum* Zahlbr. Ann. Naturh. Hofm. Wien 7: 7. 1892.

A stocky short-branched shrub in hills or small open bush or tree (especially in higher areas), the mature foliage usually glabrous except (sometimes absent) loose tufts of pubescence in the axils of the principal, often (9) 13 leaf-nerves beneath; internodes 2.5–4 cm. long, sometimes much shorter; leaves yellowish-green, elliptic-lanceolate to suboblong, obtuse, mostly about 7 (5.5–10) cm. long; inflorescence opposite, the leaves subterminal, few- (a dozen or so) flowered; peduncles 0.5–2.5 cm. long, pedicels about 1.5 cm. long (–2.5 cm. in fruit, nutant); calyx lobes subobtuse, (1) 1.5–2 mm. long; corolla white, (14) 18 mm. across, the suberect or reflexing lobes 6–8 mm. long, partly papillose-pubescent; filaments minute, anthers (3.5) 5 mm. long, subellipsoid; style 6–6.5 mm. long, stigma obtuse; berry about 14 (10) mm. in diameter.—Bitter distinguished his plant by

slightly shorter internodes, leaves and anthers; also by the smaller flowers, remarking that these characters may prove variable; he gave a description of *Weberbauer 209*, l.c. 93, from which I have drawn. F.M. Negs. 2611 (*S. hypostichopogon*); 33048 (*S. barbulatum*). Section *Anthoresis*.

Piura: Palambla, (*Weberbauer*).—Cajamarca: Cutervo, *Jelski 56* (type, *S. barbulatum*). Huambos, Prov. Chota, *Stork & Horton 10066* (det. Standley); *Soukup 4534* (det. Morton, *S. oblongum*).—La Libertad: Prov. Santiago de Chuco, *Lopez 1012*.—Lima: Below Obrajillo, *Wilkes Exped.*, type. Above Obrajillo, *Pennell 14418*. Chicla, *Weberbauer 209*. Puente del Infiernillo (Lima-Oroya R. R.), *Seler 236* (type, *S. hypostichopogon*). Viso, *568*. San Mateo and Matucana, *Raimondi* (det. Werdermann); *Isern 2537*.—Huánuco: Muña to Tambo de Vaca, 2,500 meters, *4328* (open, spreading shrub). Near Muña, *4099*. At 2,700 meters, *Woytkowski 64* (det. Cuatrecasas, tips tomentose).—Junín: Prov. Jauja, *Ochoa 531*. Carpapata, *Soukup 3465* (det. Lyman Smith).—Huancavelica: Salcabamba, *Stork & Horton 10273*.—Apurímac: Trancapata, *Vargas 9621*. Bolivia. "Shuruco" (Ochoa).

Solanum amotapense Svens. Amer. Journ. Bot. 33: 483. 1946.

Unarmed shrub 1 meter high, the contorted branches (these 5–6 mm. thick) glabrous, sulcate, the younger branchlets and peduncles puberulent with simple rarely bifurcate or branched trichomes; petioles 2–4 cm. long; leaves alternate, approximate, cordate-ovate, acuminate, to 9 cm. long, 5 cm. wide, sparsely pubescent above on the nerves, all over beneath, membranous; inflorescence terminal, mostly racemose, the peduncles 4–5 cm. long; calyx urceolate, 3–4 mm. broad, gibbous below, the 5 teeth 2 mm. long, strigose; corolla white, shortly campanulate, 1–1.5 cm. across, the 5 acute lobes pubescent without; filaments equal, basally adnate, 0.5–1 mm. long, anthers oblong, 5 or 6 mm. long, narrowed toward the apical pores; style glabrous, 9 mm. long; fruit globose, glabrous, brown, 1–1.5 cm. in diameter; seeds deltoid, 5 mm. thick, strongly compressed, yellow. —This has a superficial resemblance to *S. luteoalbum* Persoon (Svenson). The Weberbauer specimen has leaves to twice as large, corolla at least 2 cm. broad, filaments nearly 2 mm. long. Illustrated, Svenson 484, *pl. 19, fig. 1*.

Tumbez: Amotape Hills, Cerro Prieto, (*Haught & Svenson 11634*, type); *Haught 195*. East of Chicama, *Weberbauer 7634?*

Solanum anceps R. & P. Fl. Peruv. 2: 36, *pl. 169*. 1799; 155. *Bassovia anceps* (R. & P.) Rusby, Bull. Torrey Club 26: 197. 1899.

Glabrous, the cymes obscurely or minutely granular; stems terete, little branched, about 1 meter high; leaves ovate-oblong-elliptic, acute or shortly acuminate (type), 1.5 dm. long, 8 cm. wide, or to 2.5 dm. long, nearly 1.5 dm. wide, or much smaller and narrower, a little decurrent at base into the 1.5–5 cm. long petiole; subumbellate cymes axillary, binate or ternate, in fruit to 2.5 cm. long, 3–7 (8) -flowered; pedicels 2–6 mm. long, slightly longer and erect in fruit; peduncles 12–15 mm. long; corolla greenish, petals 2 mm. long; stamens about 3 mm. long, the very short filaments capillary; anthers ovate-elliptic, connivent; style filiform, erect, longer than stamens, stigma bilobed; berry early conical, a little curved toward the long beak, whitish, 1.5 cm. long, nearly 1 cm. thick near base, cuspidate, at maturity about 1 cm. thick.—Type imperfect; probably includes, naturally, *S. theobromophyllum*, *S. angustialatum*. Subgenus *Bassovia* (Aublet) Bitter, Repert. Sp. Nov. 17: 329–331. 1921; Bitter included in this subgenus (as to Peru) *S. incurvum* (*Cyphomandra* fide Werdermann), *S. mite*, *S. conicum*, *S. diffusum*, *S. ternatum*, *S. angustialatum*, *S. hederiradiculum*, *S. theobromophyllum*, *S. trizygum*, and *S. Uleanum* as well as *S. suaveolens*, var. *Endlicheri* and *S. jasminoides;* the subgenus included mostly *Polybotryon* of Dunal, defined by Bitter as perennial herbs or subligneous, glabrous or nearly, inflorescence axillary, often geminate, flowers secund, filaments short, glabrous, style nearly, corolla rotate or stellate, berry globose or conical, sclerotic ("stone") granules lacking. This is not a subgenus as constituted but may be a not unnatural subgroup, with modification and expansion. F.M. Neg. (no number). *Bassovioides.*

Huánuco: Cuchero, *Ruiz & Pavón*, type; *Poeppig 1625*. Divisoria, *Woytkowski 560*. Pampayacu, *Poeppig 1469*. Below Río Santo Domingo, Río Huallaga Canyon, *4243*. Bolivia.

Solanum angustialatum Bitter, Repert. Sp. Nov. 11: 471. 1912.

Stems very or obscurely narrowly alate by the decurrent 8–10 mm. long petioles; leaves broadly lanceolate, attenuate at both ends, acute, to 2.5 dm. long, about 1 dm. wide, glabrous unless minutely stipitate-glandular on the 17–18 nerves both sides; peduncles geminate, axillary, to 12 mm. long, 10–14-flowered; pedicels glabrate but minutely glandular, about 5 mm. long; calyx 2 mm. across,

scarcely lobed; corolla lobes 2–3 mm. long, papillose-pilose; filaments 0.3–0.4 mm. long, glabrous, anthers ellipsoid, 1.7 mm. long; style to 3.5 mm. long, with a few 1–2-celled trichomes toward the obtuse stigma, not obviously papillose.—Originally placed by author in section *Polybotryon*. F.M. Neg. 33045.

San Martín: Tarapoto, *Spruce 4849*, type; *6260*. Jepelacio, *Klug 3757*. San Roque, *Williams 6929; 7689*. Prov. Mayo, *Williams 6260*. "Viuda shambu" (Williams).

Solanum anisophyllum Van Heurck & M. Arg. Obs. Bot. 52. 1870.

Similar to *S. confine* Dunal but as to type all the upper leaves geminate, the smaller of each pair suborbicular and the flowers somewhat larger.—It seems probable that these are variable characters and unless there are other differences the plant, with *S. loretoanum* Bitter, which apparently is intermediate, is actually a part of one entity. F.M. Neg. 22874. Section *Leiodendron*.

San Martín: Tarapoto, *Spruce 4250*, type (once referred by Bitter to *S. pulchrum*); also *4830*. San Roque, *Williams 7616*.

Solanum aureum Dunal, Syn. 16. 1816; 102. Vars. *latelanceolatum* Bitter, Bot. Jahrb. 54, Beibl. 119: 13. 1917; *angustelanceolatum* Bitter, l.c. *S. cutervanum* Zahlbr. Ann. Naturh. Hofm. Wien 7: 7. 1892.

A sometimes climbing shrub with alternate narrowly lanceolate to ovate-elliptic subacute entire leaves, lustrous above in age, stellate-pilose beneath, and terminal laxly divaricate inflorescences pulverulent-tomentose with (at least early) rusty-yellow stellate branched trichomes; petioles to 1.5 cm. long; leaves 3–5 (–7) cm. long; lateral nerves 5–8, prominent beneath; peduncles dichotomous; pedicels basally articulate, 4–7 mm. (in fruit –12 mm.) long; calyx about 4 mm. long, 7–8 mm. across, the triangular lobes acute; corolla violet, about 17 mm. broad, tomentose without, the lanceolate-oblong lobes 6 × 4 mm., revolute margined; filaments minute, anthers narrow, to 4 mm. long, pubescent only within; style to 6.5 mm. long, curved below the subglobose stigma, papillate toward base; berry without granules.—Perhaps the second of Bitter's varieties merits recognition on the basis of the leaves being narrowed at each end, the fruit the typical form, somewhat cordate at base; he gave a detailed description in Repert. Sp. Nov. 16: 83. 1919, which is in part included here. Perhaps correctly a part of *S. nitidum*

R. & P. The var. *riobambense* Werd., Notizbl. Bot. Gart. Berlin 12: 379. 1936, has leaves glabrous above and beneath except for a few brownish trichomes on midnerve; inflorescence irregularly dichotomous; this is often so in contrast to the usually simple inflorescence of *S. nitidum*. Series *Endotricha* Bitter, anthers pubescent on the inner side, style papillose at base, and Series *Monadelphoidea* Bitter (includes *S. monadelphum*, *S. marmellosanum*, *S. sessile*, *S. pteropodum*, *S. amblophyllum*, and *S. hypostichopogon*) are according to Bitter in 1920 "diverse." F.M. Negs. 2890; 33065 (*S. cutervanum*). Section *Anthoresis*.

Piura: Ayavaca, *Soukup 4337* (det. Morton).—Cajamarca: Cutervo, *Jelski 30* (type, *S. cutervanum*).—Huánuco: Mito, *1859*. Yanano, *4933*. Chaglla, *Weberbauer 6700* (type, var. *latelanceolatum*). Ecuador.

Solanum caudatum Dunal in DC. Prodr. 13: 140. 1852.

Shrub with glandular subterete branches and leafless flowering branchlets, scarred by many large leaf- or flower-bases; leaves glabrous, obovate-lanceolate, cuneate, abruptly cuspidate (acumen subfalcate, 16 mm. long), about 2 dm. long and nearly one broad, unevenly verruculose beneath, 8–10 lateral nerves there prominent, reticulate with the veins; petioles subterete, canaliculate above, rugulose, 1.5–2 cm. long; peduncle (or perhaps branchlets?) to 3 dm. long, little incrassate toward apex; pedicels (or peduncles) 2-flowered, solitary or geminate; fruiting calyx 8 mm. across, deeply parted, the divisions linear, acute; berry globose, 8–10 mm. thick.—Flowers unknown; the long subulate acumen from the rounded leaf-tip is only partly equaled by *Killip & Smith 28087* (sterile in specimen seen) which Morton in herb. suggested as a new species. F.M. Neg. 34114. Section *Leiodendron*.

Peru(?): (*Ruiz & Pavón*, type, Herb. Geneva).

Solanum chachapoyasense Bitter, Repert. Sp. Nov. 16: 13. 1919.

A shrubby plant, possibly scandent, the leaves and upper branches (internodes 2–3 cm. long) densely and softly pubescent with yellowish simple hairs; petioles 1–1.5 cm. long; alternate leaves elliptic-lanceolate, 2.5–4.5 (6) cm. long, about 1.5–2 (4) cm. wide, mostly very oblique at the rounded base; minute (0.5–1.5 mm. long) stipule-like leaves present in the leaf-axils; inflorescence 5–6-flowered, congested to lax, borne at the tip of small branchlets, these with inter-

nodes 2–7 mm. long; pedicels about 1 cm. long; calyx lobes lanceolate, often in part connate, 4 mm. long; corolla rotate-stellate, 1.5 cm. across, the lanceolate lobes involute and pilosulous toward tip, 8 mm. long; filaments 1 mm. long, pubescent below, anthers narrowly ellipsoid, 4 mm. long, cordate at base, introrse apical pores oblique; style 7.5–8 mm. long, glabrous or nearly, the stigma obviously bilobed.—A soft, weak herb, corolla white (Stork & Horton) but stem ligneous. The section, described by Bitter, l.c. 11: 247. 1913, includes in Peru also *S. oxycoccoides* Bitter and several Ecuadorian species, all with solitary flowers or few often on short axillary branchlets, stem usually scandent with nodal roots. F.M. Neg. 23104. Section *Anarrichomenum.*

Cajamarca: Shrub-land west of Socota, 2,800 meters, *Stork & Horton 10104.*—Amazonas: Chachapoyas, *Mathews,* type.—Junín: Carpapata, *Soukup 3463.*

Solanum chloranthum Spreng. Neue Entd. 28: 1822; 372? *S. arenarium* Sendt. in Mart. Fl. Bras. 10: 26, *pl. 3, figs. 16–18.* 1846; DC. Prodr. 1: 129. 1852, fide Bitter, Repert. Sp. Nov. 16: 400. 1920.

Shrub, the terete branchlets early pulverulent-tomentose with yellowish, densely branched trichomes, their branches divaricate, simple, this indument also on leaf venation above (lateral nerves 8–10), leaf-surface beneath and few-flowered simple inflorescences including the corolla without; petioles 3–5 mm. long, mostly solitary, the entire coriaceous leaves long-elliptic or lanceolate-elliptic, obliquely cuneate into petiole, obtuse, about 1–1.5 dm. long, nearly half as wide at or above the middle; racemes subopposite leaves, peduncles 4–7 mm. long, pedicels 7–9 mm. long; calyx 2.5 mm. long, 3.5 mm. broad, crenate, the lobes only about 1 × 1 mm.; corolla 8–10 mm. across, the lanceolate lobes 4 mm. long, 1.5 mm. wide, only the cucullate tip puberulent within; filaments basally connate, to 0.6 mm. long, anthers ellipsoid, emarginate, 2.2 mm. long; pores lateral and overhung; style slender, glabrous, 5 mm. long, stigma capitate.—After Bitter, l.c., as to synonymy, who places plant in *Anthoresis-Indubitaria.*

Peru (possibly). Brazil.

Solanum confine Dunal in DC. Prodr. 13: 137. 1852.

Glabrous half-shrub or shrub-tree, apparently near to *S. oppositifolium* R. & P. but the lower leaves geminate, the larger ovate-lanceolate to elliptic, acuminate, unequal at decurrent base, to

nearly 1.5 dm. long (often apparently smaller) and half as wide, the smaller of each pair 2.5–5 cm. long, 1–2 cm. wide, sessile or subsessile, acute or obtuse, reticulate-veined, membranous, lustrous above, the 10 or 11 lateral nerves rather prominent beneath; cymes opposite the leaves, in flower to 1.5 cm. long, in fruit about 2 cm. long; pedicels about 8 mm. long, to 12 mm. long or longer in fruit, incrassate at tip; calyx urceolate, about 3 mm. broad, the lobes subovate, mucronate; corolla lobes lanceolate, acute, white, 2.5–3 mm. long; anthers fleshy, 2 mm. long, dehiscing by 2 subapical chinks; style straight, erect, clavate toward the capitate stigma, very spheroid, at least 6 mm. long.—Sometimes a tree to 7 meters high (Killip & Smith); sometimes seems to have few, even no geminate leaves, and especially in fruit simulates the larger-flowered plant of Ruiz and Pavón; an apparent variation is var. **curtum** Macbr., var. nov., pedunculis pedicellisque circa 5–7 mm. longis. Some of the following collections may belong to *S. loretoanum* Bitter, scarcely distinguishable, at least in some cases. *S. supranitidum* Bitter, Repert. Sp. Nov. 18: 69. 1922, of adjacent Brazil may occur; the younger leaves beneath as the many-flowered inflorescence are villosulous. F.M. Negs. 6782; 2624 (var.). Section *Leiodendron.*

San Martín: Tarapoto, *Spruce 4161* (det. Bitter); *4830; Williams 5527; 6179; 6260; 6767* (var.). Juanjuí, *Williams 6921.* San Roque, *Williams 6929*; *6965.*—Huánuco: Puerto Lira, Río Pachitea, *Killip & Smith 26829* (shade form). Prov. Huamalies, *Weberbauer 2624?* —Loreto: Yurimaguas, *Williams 4377; 3851; Killip & Smith 27610; 28163* (det. Morton); *27861; Poeppig 2279.* Iquitos, *Killip & Smith 26981; 29878; Klug 834* (type, var. *curtum*).

Solanum cruciferum Bitter, Repert. Sp. Nov. 16: 402. 1920.

A low (about 1 meter high) shrub well-marked by its subsessile (1–) 2-flowered lateral inflorescence and tetramerous calyx and corolla; branches and especially the leaves beneath very lightly tomentulose (trichomes many-celled) and glandular, in age glabrous; leaves alternate or geminate, subsessile, entire or undulate, oblong-lanceolate, often acuminate, 2–4 cm. long, 7–12 mm. wide; pedicels deflexed, 1.5–2 cm. long, little longer in fruit; calyx lobes ovate, acuminate, minutely glandular, about 2 mm. long; corolla white, stellate, 14 mm. across, the broadly lanceolate cucullate lobes about 7 mm. long, partly pilose; filaments and anthers glabrous, the former 0.8 mm. long, basally connate, the latter narrowly ellipsoid, 4 mm. long; style

straight, 6–6.5 mm. long; berry without granules.—F.M. Neg. 2603. Section *Anthopleuris.*

Cajamarca: Chugur, northwest of Hualgayoc, *Weberbauer 4092,* type.

Solanum deflexiflorum Bitter, Repert. Sp. Nov. 18: 49. 1922.

Shrub, glabrous or glabrate except the pulverulent nodes and branchlet tips, the leaves beneath, the 11 or so primary nerve-axils, the short inflorescences including calyces and the corollas, these white, stellate, especially toward the tip of the acute or subobtuse lanceolate lobes; petioles 7–12 mm. long; leaves broadly lanceolate, 4–4.5 cm. wide, 9.5–11 cm. long, acuminate into petiole, subacutely acuminate; inflorescence opposite leaves, simple, subsessile, 5 mm. long; flowers 12–15, pedicels 12–13 mm. long, deflexed; calyx campanulate, 2.5 mm. long, 4–5 mm. broad, lobes ovate, 1–1.5 mm. long; corolla 14–17 mm. across, lobes 6 or 7 mm. long, glabrous within; filaments glabrous, connate at base; style as stamens about 4.5 mm. long, the stigma capitate.—Peruvian collections, det. Morton, "near *S. deflexiflorum,*" with oval leaves, smaller flowers, so, perhaps var. **diversum** Macbr., var. nov., foliis 1–2 dm. longis, 8–10 cm. latis, corollis circa 5 mm. longis. Section *Leiodendron.*

Loreto: Creek Carapisa, above Pongo de Manseriche, *Mexia 6261* (type, var.). Colombia.

Solanum dibrachiatum Van Heurck & M. Arg. Obs. Bot. 59. 1870. *S. campaniforme* Roem. & Schult. Syst. 4: 662. 1819, as to Peru?

Shrub, glabrous or essentially, with geminate or in part alternate chartaceous leaves, the typically more or less obovate larger often 1.5–2 dm. long, the smaller (when present) oblong-elliptic, 3–6 cm. long, nearly as wide, sometimes larger; peduncles forked or dichotomously branched, 1–4 cm. long, the branches becoming as long or longer; pedicels 5 mm. long in flower, incrassate but often not much longer in fruit; anthers to 5 mm. long; otherwise apparently similar to *S. acuminatum* R. & P.—This plant has the aspect of a *Cyphomandra* without anther connective thickening; in Herb. Geneva it was noted by Bitter as a variety or subspecies of *S. pulchrum* Dunal. The leaves apparently vary from ovate-elliptic to oblong-lanceolate; several Iquitos specimens were referred by Morton to *S. campaniforme* Roem. & Schult. perhaps correctly, but they lack the long peduncles and filiform pedicels; on the other hand, while most of the in-

florescences are at least 1-furcate, the leaves resemble more *S. oblongum* (and *S. acuminatum*). Flowers greenish-white (Stork & Horton); berries 13 mm. in diameter (Williams). F.M. Neg. 23021. Section *Leiodendron.*

San Martín: Tarapoto, *Spruce 4250,* type. San Roque, *Williams 7217; 7655.* Juan Guerra, *Williams 6860.*—Huánuco: Tingo María, *Stork & Horton 9486.*—Loreto: Santa Rosa, *Williams 4764; 4932; Killip & Smith 28971; 28717* (det. Morton). Puerto Arturo, *Williams 5238; Killip & Smith 27920.* Yurimaguas, *Williams 4097; 4596.* Caballo-cocha, *Williams 2095; 2224; 2281; 2310.* Iquitos, *Killip & Smith 27054* (det. Morton); *Williams 7912; 8066; 8184.* Río Itaya, *Williams 57; 248; 3518; 3385.* La Victoria, *Williams 2992; 3110.* Pongo de Manseriche, *Mexia 6338?* (see note under *S. pulchrum*). Rancho Indiana, *Mexia 6421* (det. Morton, *S. campaniforme*).

Solanum hederiradiculum Bitter, Repert. Sp. Nov. 11: 12. 1912.

High-climbing liana, the pubescent branches affixed to tree-trunks by numerous rootlets; petioles 3–5.5 cm. long; leaves broadly elliptic, abruptly attenuate at base, subacuminate, to 18 cm. long, 9–10 cm. wide, at least the veins on both sides most minutely but densely pubescent; inflorescence axillary, mostly geminate, to 15-flowered; peduncles about 2.5 cm. long; pedicels 5 mm. (to 9 mm. in fruit) long; calyx pubescent, scarcely lobed, 2.5 mm. broad; corolla yellowish-white, the spreading lobes about 4 mm. long, densely pubescent without, especially at the cucullate apex; filaments scarcely 0.5 mm. long, anthers 2 mm. long; style papillose above, 4 mm. long; berry conical.—Probably related to *S. conicum* R. & P., notwithstanding its simple leaves; cf. *S. theobromophyllum* Bitter, erect, and *S. robustifrons* Bitter, creeping toward or at base. F.M. Neg. 2608. Section *Polybotryon.*

Loreto: Yurimaguas, *Ule 6276,* type. Balsapuerto, *Klug 2864.* La Victoria, *Williams 3137.* Iquitos, *Killip & Smith 27329.*

Solanum Lechleri Rusby, Bull. Torrey Club 26: 193. 1899.

Stellate-tomentose, unarmed (type), the mature leaves dark green and only slightly pubescent above; petioles 1–2 cm. long, narrowly marginal; leaves 5–10 cm. long, 2–5 cm. wide, ovate, broadly rounded to subtruncate at base, acutely acuminate, entire, membranous, venation slender; peduncles in type terminal, 4 cm. long; pedicels subpendent, 7–10 mm. long, weak; calyx 4–5 mm. long, lobed two-thirds,

lobes ovate, subacute as broad sinuses; corolla substellate, at least 1 cm. across, lobes broadly ovate, obtuse; anthers yellow, 3.5 mm. long, pores subapical, introrse; style much longer, stigma small; berry dark, 7 mm. in diameter.—Branches herbaceous; type (*Rusby 790*) from Yungas, Bolivia, but according to the author the same as *Mandon 1106* and the Lechler collection, this presumably from southern Peru.

Peru (*Lechler 1939*, fide author). Bolivia.

Solanum loretoanum Bitter, Repert. Sp. Nov. 18: 70. 1922.

Type an essentially glabrous shrub 1–2 meters high, upper branches 2.5–3 mm. in diameter, internodes 5–6 cm. long; lower leaves solitary, upper geminate, the larger broadly elliptic-lanceolate, often 1.5–2 dm. long, 7–9 cm. wide, broadly cuneate to short (5–6 mm. long) petiole, acutely or subobtusely acuminate, lateral nerves mostly 12, the smaller leaves obliquely ovate or suborbicular, obtuse or rounded, about 1.5 cm. long, to twice as broad; racemes 6–12-flowered, obscurely glandular; peduncles 5–17 mm. long; pedicels slender, slightly shorter than 1 cm.; calyx 1 mm. long, 2 mm. across, acute lobes marginally puberulent; corollas white, stellate, 8 mm. across, the lanceolate lobes 2.5–3 mm. long, papillose only at short recurved tips; filaments scarcely 0.5 mm. long, anthers broadly ellipsoid, 1.6 mm. long, apical introrse pores oblique; style glabrous as little shorter stamens.—Cf. *S. confine* Dunal; calyx, developed, is probably larger. F.M. Neg. 2619.

Loreto: Yurimaguas, *Ule 6277*, type. Mouth of Río Santiago, *Tessmann 3968; 4531* (vel aff., det. Werdermann). Pongo de Manseriche, *Mexia 6247; 6212A* (det. Morton).

Solanum luteoalbum Pers. Syn. 1: 221. 1805; Dunal, Syn. 18. 1816; 121. *S. pubescens* R. & P. Fl. Peruv. 2: 36, *pl. 169, fig. b.* 1799, not Willd. 1794. *S. foetidum* R. & P. l.c. 39?, not Rottb. 1778. *S. maleolens* Macbr. Field Mus. Bot. 8: 111. 1930.

A low shrub, rather sparsely and finely villous (with simple trichomes); leaves ovate, subabruptly acute; racemes lateral, the flowers whitish-yellow; petioles about 1.5 cm. long; leaves mostly 8–10 cm. long and about half as wide, early more or less puberulent or hispidulous mostly on the 5–7 pairs of nerves; calyx deeply parted, the acute lobes reflexed in fruit; berry orange, lustrous, globose, size of a cherry (Ruiz & Pavón), to 2 cm. thick, the fruiting peduncles to 4 cm. long, pedicels 1.5 (–2) cm. long, apically incrassate; seeds brownish-red or darker, reniform, 6 mm. long, 4 mm. wide, finely

scrobiculate.—The description is drawn in part from my fruiting material, which apparently is this species. *S. foetidum* R. & P., at least as to Dunal, who describes the seeds as smooth, may not belong here; and if there are two species the glabrous or early puberulent one with foetid odor, "berries the size of walnuts," may be *S. maleolens* Macbr. (i.e. *S. foetidum* R. & P.). The Cuzco specimens, in fruit, are canescent with a dense tomentum of stellate trichomes; no flowers but probably a distinct species, perhaps introduced; for convenience it may be recorded as var. **tunya** Macbr., var. nov., foliis utrinque stellato-tomentosis. F.M. Neg. 29723 (*S. pubescens*).

Huánuco: Cuchero, *Ruiz & Pavón*, type. Mito, *3273*. Yanano, *3795*. Tarma, *Ruiz & Pavón* (type, *S. foetidum*); *1038*.—Cuzco: Ollantaitambo, *Cook & Gilbert 387a; 804* (type, var.); *West 6476* (var.). Brazil? "Ama de casa" (Ruiz & Pavón), "pajarito," "tunya-tunya" (Cook & Gilbert).

Solanum manicatum Bitter, Bot. Jahrb. 50, Beibl. 111: 63. 1913.

Type a 3-meter shrub with lustrous purplish branches (decurrent lines obscure), glabrous except for tufts of branched trichomes in the axils of the leaf-nerves beneath and about the sleeve-like insertions of the pedicels on the inflorescence-branches; petioles 1–1.5 cm. long; leaves oblong-lanceolate, to 2 dm. long, 4–5 cm. wide, narrowed to each end, the lateral nerves (about 18) and veins impressed above, prominent beneath; inflorescence (type) nearly 1.5 dm. long and broad, terminal; pedicels slender, to 2.5 cm. long in flower; calyx 5–7 mm. wide, the rounded lobes 2 × 2 mm.; corolla white (pale yellowish, Metcalf), the spreading lobes lanceolate, acute, 1.5 cm. across, 6 mm. long, subcoriaceous, densely hairy at the cucullate apex; filaments short, glabrous, anthers deeply cordate, 5 mm. long; style in part pubescent, 6–8 mm. long; berry yellow-green, about 8 mm. in diameter.—Related to *S. oligerum* Schlechtd. of Mexico but lacking the winged stems (Bitter); apparently, if correctly interpreted, in pubescence and inflorescence, the latter sometimes reduced or perhaps simple. F.M. Neg. 2620. Section *Anthoresis*.

San Martín: Jepelacio, *Klug 3371*.—Ayacucho: Prov. of Huanta, between Tambo and the Río Apurímac, *Weberbauer 5643*, type.—Apurímac: Pachachaca Valley, *West 3789* (det. Johnston, *S. confine*).—Cuzco: Marcapata, *Metcalf 30729* (det. Killip).

Solanum marmellosanum Bitter, Repert. Sp. Nov. 16: 89. 1920.

Shrub, glabrous except for some obscure punctate glandulosity and a dense papillosity on the cucullate corolla lobes; leaves approximate, entire, sessile, broadly oblong-elliptic, becoming 3 dm. long, 1.5 dm. wide or larger, narrowed abruptly to base, gradually to acute apex, the 14–16 subparallel nerves prominent beneath; inflorescence terminal, 3-forked, many-flowered, peduncles 3 cm. long, pedicels at least 1 cm. long; calyx 6–7 mm. long, 7–8 mm. across, the lobes about 3 mm. long; corolla campanulate-stelliform, to 18 mm. across, the lanceolate lobes 8 or 9 mm. long; filaments shorter than 1 mm., annulate at base; anthers ellipsoid, emarginate basally, about 5 mm. long; style 3.5 mm. long, enlarged toward subclavate stigma.—Near *S. sessile* R. & P. and probably merely a variant with slightly smaller flowers and apparently merges also with *S. dibrachiatum* Van Heurck & M. Arg. The Peruvian specimens have a small rounded leaf at the base of the larger but one is present on a similar specimen (*Klug 2883*) referred by Standley to *S. sessile* R. & P. and with the larger flowers of that species. Section (*Anthoresis*) *Leiodendron.*

Loreto: Soledad, *Killip & Smith 29564; 29712; 29779* (det. Morton). Amazonian Brazil.

Solanum maturecalvans Bitter, Bot. Jahrb. 11, Beibl. 111: 64. 1913.

Similar to *S. amblophyllum* Hook. but the tufts of pubescence felt-like and occurring irregularly on the leaf veins beneath and on the young branchlets; a low shrub, otherwise glabrous (minutely glandular on nerves above), with elliptic-lanceolate subcoriaceous leaves 5–9.5 cm. long, 2.5–3.5 cm. wide, and white flowers (about 6 mm. long) borne in short at least early terminal inflorescences of 3–6 flowers each; pedicels to 17 mm. long, in fruit 2 cm. long or longer; calyx lobes 2–2.5 mm. × 2 mm., rounded; corolla lobes 5–5.5 mm. long, densely pulverulent toward tip, papillose without; filaments minute, glabrous; anthers about 3.5 mm. long, the little longer style glabrous; stigmas subclavate; berry 12 mm. in diameter, granules absent.—Probably will prove to be a part of *S. amblophyllum* Hook. F.M. Neg. 2622. Section *Anthoresis.*

Ayacucho: Prov. of Huamanga, above Quinua, *Weberbauer 5543*, type.

Solanum Miquelii Morton, Contr. U. S. Nat. Herb. 29: 43. 1944. *S. laetum* Miq. Stirp. Surinam 135. 1850, not Kunze, 1842. *S. sempervirens* Dunal in DC. Prodr. 13: 88. 1852, not Miller, 1768.

S. crispum R. & P. Fl. Peruv. 2: 31, *pl. 158, fig. a.* 1799, at least as to Peru.

Vine, the upper slightly angled stems and terminal panicles pilosulous-puberulent, in Peru stellulately, typically also punctiform-glandular; petioles more or less curved, 6–10 mm. (in Peru to 3 cm.) long; leaves glabrous, subrepand to plicate-undulate, subcoriaceous (in Peru membranous), few-nerved and reticulate beneath, broadly ovate to ovate-elliptic-lanceolate, unequally cordate or rounded at base, obtuse to acuminate, many very unequal, often 5–7 cm. long, 3–5 cm. wide; panicles to 1 dm. long, foliose at base, branches few, short, divaricate; pedicels 4–6 mm. long; calyx 3 mm. broad, the broad subquadrate lobes mucronulate; corolla bluish or lilac, 1 cm. long, segments suboblong, puberulent; anthers oblong-linear, to 6 mm. long, obliquely dehiscent.—*S. crispum* R. & P. as to type is Chilean and has anthers only 3 mm. long; it may be a variable species.

Huánuco: Forest edge, Divisoria, *Woytkowski 550* (det. Cuatrecasas, *S. crispum*).—Loreto: Río Nanay, *Williams 511; 549.* Florida, Río Zubineta, *Klug 2320; 2071* (det. Morton). Mouth of Río Tigre, *Killip & Smith 27539* (det. Morton). Chile(?); Guianas.

Solanum monadelphum Van Heurck & M. Arg. Obs. Bot. 42. 1870.

Shrub, glabrous except the white flowers within; closely related to *S. sessile* R. & P. but leaves mostly much smaller, sublanceolate, 8–17 cm. long, 1.5–4.5 (6) cm. wide, lateral nerves yellowish, 9–10; inflorescence 2–3-forked, many-flowered; peduncles to 4 cm. long, pedicels to 7 mm. long, probably larger in fruit; calyx about 5 mm. long, 6 or 7 mm. wide, unequal, 3 lobes 2–2.5 mm. long; corolla about 12 mm. long, 14 mm. across, two-thirds connate, the free portion of the lobes broadly triangular, acute, 5–7 mm. long, apically only papillose-pilose; filaments 5, connate at base for nearly 2 mm., to 2.7 mm. long; anthers ellipsoid, emarginate at base, 5 mm. long, 1.5–1.8 mm. wide, glabrous as the straight style, this 4–6 mm. long, the stigma obtuse.—After Bitter, Repert. Sp. Nov. 16: 87. 1920; Allard determinations by L. Smith. F.M. Neg. 22902. Section *Anthoresis.*

San Martín: Tarapoto, *Spruce 4051,* type; *Ule 6632; Williams 6734.* Boquerón Pass, *Allard 21719; 22111.*—Huánuco: Tingo María, *Allard 21153; 21728A.* Chaglla, *3656.*—Loreto: Puerto Yessup, *Killip & Smith 26400* (det. Morton). Yuroc, *Allard 22148.*

Solanum nitidum R. & P. Fl. Peruv. 2: 33, *pl. 163*. 1799; 93. *S. angustifolium* R. & P. l.c., not Lam. 1797. *S. pulverulentum* Pers. Syn. 1: 223. 1805, not L.; 100. *S. gnaphalioides* Pers. l.c.; 127. *S. calygnaphalum* R. & P. l.c. 31; 127. *S. stenophyllum* HBK. ex Dunal, Syn. 15. 1816; 101. *S. havanense* Jacq. Enum. Carib. 15. 1760, as to Peru.

Typically glabrous except the inflorescence (this also glabrous in a var.), the branches above subherbaceous, lustrous as the leaves, these ordinarily oblong-lanceolate, subrepand, acute or shortly decurrent at base, more or less acuminate, mostly 1–1.5 dm. long, 2.5–4 cm. wide, the many slender subparallel lateral nerves reticulate with the veins and rather prominent beneath; petioles 5–15 mm. long; racemes early terminal, the lower opposite the often crowded leaves pulverulent to stellate-tomentulose (except var.), often including the calyces; pedicels subumbellate, articulate at base, apically incrassate, arcuate in fruit when at least 1 cm. long, calyx cyathiform, the 5 ovate-subulate segments acute, scarcely 2 mm. long; corolla lilac-purple, deeply 5-parted, 1.5–1.8 cm. across, the lanceolate-oblong segments subobtuse; stamens equal, anthers linear, subemarginate, dehiscing by short finally lateral chinks; style straight, longer than stamens, the stigma subglobose-capitate; berry 8–10 mm. in diameter, dark red when mature, the small dark seeds angular.—Variable in size, especially of leaves, and in extent of pubescence (*S. calygnaphalum*, *S. pulverulentum*); this, apparently correctly, was treated as a variety of *S. calygnaphalum* by Bitter in Herb. Madrid, and for convenience ought to be recorded as a variant of *S. nitidum*. Bitter once wrote *S. calygnaphalum* var. *nitidum* (R. & P.) Bitter. *S. gonocladum* Dunal, 93, type from La Paz, is apparently similar and may be Hutchison's *1243*, but extreme in being densely canescently pubescent. *S. stenophyllum* HBK., 101, is doubtfully more than a narrower-leaved individual (leaves to 8 cm. long, 1.5 cm. wide) of the puberulent form. *S. havanense* Jacq. has broadly elliptic corolla lobes, blue berries. Most extreme is P. C. Hutchison's *1243*, which may be distinct, here recorded as var. **Hutchisonii** Macbr., var. nov., glaberrimum; petiolis 2 cm. longis, foliis 5–6 cm. longis, ad 1.5 cm. latis, subovatolanceolatis, veniis obscuris; pedunculis 1–2 cm. longis, pedicellis 1.5 cm. longis; floribus glabris calyce irregulariter 2–3-fido, laciniis plus minusve connatis, subulato-apiculatis; petalis glabris vel margine breviter ciliolatis, circa 8 mm. longis. F.M. Neg. 29726.

The berries are used as a yellow dye (Raimondi) and as a cosmetic and are saponaceous; leaves when toasted expel thorns (Ruiz and Pavón).

Piura: Olleros to Yauta, (Bonpland, type, *S. stenophyllum*).—Ancash: Chiquián, *Ferreyra 5836*. Recuay, *2515*.—Lima: Oyon, 3,000 meters, *Ferreyra 3536*. Chicla, *Safford*. Río Blanco, *Killip & Smith 21714*. Baños, *Wilkes Exped.*—Huánuco: Acomayo, *Ruiz & Pavón* (type, *S. angustifolium*). Mito, *1670*. Near Tambo de Vaca, *Woytkowski 117; 144*.—Junín: La Quinua, *2011; Ochoa 328*. Tarma and Acobamba, *Ruiz & Pavón* (type, *S. angustifolium, S. calygnaphalum*). Tarma, *1075; Soukup 2539; Ruiz & Pavón*, type. Carpapata, *Killip & Smith 24365*. Ocopa, *Killip & Smith 22002*. Huancayo, *Ledig 3; Isern 2062; Killip & Smith 23346*.—Huancavelica: Pampas, *Smith & Horton 10241; 10833; Soukup 2772*.—Ayacucho: Tortorabama, *Weberbauer 5483*. Lucanas, *Hutchison 1243* (var.). Ccarrapa, *Killip & Smith 22468*.—Apurímac: Cunyac, Prov. Abancay, *Vargas 461; Ferreyra 2792*.—Cuzco: Panticalla Pass, *Cook & Gilbert 1889*. Puquiura, *Cook & Gilbert 1937*. Near Cuzco, *Herrera 684; Pennell 13709*. Paucartambo, *Pennell 14148; Herrera 1070*. Valle de Vilcanota, *Velarde Nuñez 1325*.—Puno: Near Puno, *Soukup 360; Mexia 04200* (det. Johnston, *S. pulverulentum*). Chuquito, *Metcalf 30678*. Limbani, *Metcalf 30470* (det. Killip).—Tacna: Azapa, *Eyerdam 24645*. Candarave, *Metcalf 30378*. "Nununya," "rapace" (both Ruiz & Pavón), "campucassa," "huiscacassa," "tacachilla," "catruincho," "cahuincho," "illauru."

Solanum nutans R. & P. Fl. Peruv. 2: 34, *pl. 166, fig. a*. 1799; 128.

A shrub, rusty tomentose-pulverulent, especially the young branchlets, leaves beneath, calyx and corolla, the flexuose branches glabrate in age as leaves above; pubescence branched on younger branchlets, sublanuginous; petioles to 1.5 cm. long; leaves elliptic-ovate, mostly 1–1.5 dm. long, 4.5–6 cm. wide or larger, shortly acuminate, rather prominently reticulate-veined especially beneath; lateral nerves many; inflorescence opposite the leaves, to 2.5 cm. long, in fruit to 3 cm., closely few-flowered, the peduncle none or recurved, pedicels apically incrassate, 2–5 mm. long; calyx subcampanulate, 5–7 mm. across, glabrous within, the oblong segments subobtuse, corolla about 8 mm. long, 1 cm. broad, pulverulent without, glabrous within, 5-parted nearly to base, the ovate-lanceolate segments acutely acuminate, cream-colored or white; stamens equal, subsessile, half as long as

corolla, the stout dark purple anthers dehiscing by 2 anterior chinks; ovary subangled, glabrous, the straight erect subtrisulcate style longer than the stamens, the stigma obscurely trilobed; fruit yellow, globose, 2 cm. in diameter.—F.M. Neg. 2627. Section *Anthopleuris.*

Cajamarca: Cutervo, *Raimondi.*—Huánuco: Pillao, *Ruiz & Pavón,* type. Southwest of Huánuco, *2103; Dombey.* Yanahuanca, *1214.* Northwest of Mito, *1925.* Mito, *1473.* Muña, *4278; 4325.* Tambo de Vaca, *4416?* (fruit). Gauhuncho, *Sawada 52.*—Junín: Pichis Trail, *Killip & Smith 25835?* "Chuculate" (Ruiz & Pavón), "campucassa," "huiscacassa."

Solanum oblongifolium HBK. Nov. Gen. & Sp. 3: 27. 1818; 96. *S. hypomalacophyllum* Bitter, in Pittier, Man. Pl. Us. Venez. 137. 1926?

Branches smooth, glabrous, the branchlets (type) as peduncles, pedicels (4–6 mm. long) villous pubescent; petioles 12–16 mm. long, canaliculate, auriculate, with small sessile suborbicular leaves in the axils; leaves geminate, elliptic-oblong, acute, narrowed to base, subentire, 1.5 dm. long, nearly half as wide, the smaller about half as large, firm-membranous, glabrous and green above, paler and (typically) pubescent beneath on the midnerve and veins, or fulvous-tomentose (Bitter); flowers many, in subterminal bifid pilose recurving racemes; pedicels incrassate apically; calyx subglabrous, 6–7 mm. across, the 5 equal spreading segments subrotund-ovate, obtuse; corolla white, glabrous, about 1.5 cm. across, the ovate-oblong obtuse lobes spreading; stamens equal, half as long as corolla, subsessile, anthers connivent, oblong-linear, obtuse, apically bipored, equaling erect style, stigma obtuse.—Bitter's description reads: Tall robust fistulose herb, large lanceolate leaves glabrous above, fulvous tomentose beneath, flowers small in terminal corymbs; thus essentially a *nomen nudum;* type from Merida, Venezuela; HBK. type from Colombia. The Peruvian variant has leaves to 3 dm. long, nearly 1 dm. wide, alately long-decurrent to a broad short petiole, small leaves at axils, larger leaves (in each pair) not very unequal, scurfy tomentose beneath, perhaps varying in development but worthy of note as var. **Soukupii** Macbr., var. nov., petiolis subalatis, foliis subequalibus, subtus furfuraceo-tomentosis.

Piura: Ayavaca, *Soukup 4336* (type, var.).—Cajamarca: Huambos, 2,000 meters, *Soukup 4493* (det. Cowan). Colombia; Venezuela?

Solanum oblongum R. & P. Fl. Peruv. 2: 34, *pl. 165, fig. b.* 1799; 148.

Allied to *S. acuminatum* R. & P.; glabrous except for a glandular exudate and often a sparse puberulence on inflorescence, on the young branches and beneath near the midrib; petioles 1–3 cm. long; leaves strongly geminate, usually coriaceous, veins reticulate-impressed above, more or less prominent beneath, ordinarily with 10–12 primary nerves; larger leaves oblong-elliptic, subobtuse to acuminate, 1–2 dm. long, half as wide, the smaller similar or broader but shorter, often 5–8 cm. long scarcely half as wide; flowers crowded, the racemes 1–4 cm. long, peduncles 1–1.5 cm. long (rarely none?); pedicels to 1.5 cm. long, rather stout, somewhat longer and incrassate above in fruit; calyx campanulate, lobes short, rounded but minutely mucronulate; corolla white or faintly purplish, stellate, 1–2 cm. across, the oblong-lanceolate lobes puberulent at cucullate tip, 8–10 mm. long; anthers oblong-ellipsoid, 4.5–5.5 mm. long, the filaments 0.3–1 mm. long; style 6 mm. long, glabrous as ovary, the stigma bilobed.—My material is glabrous, the anthers shorter, the filaments longer than in the specimens described by Bitter, Bot. Jahrb. 54, Beibl. 119: 13. 1916, from Weberbauer and Ruiz and Pavón collections. My *3732* has obtusely acuminate leaves, cuneate at base, while *5205* has puberulent branches, submembranous acuminate leaves, peduncle obsolete; it can be recorded as var. **abruptum** Macbr., var. nov., ramulis pulverulentis, pedunculis obsoletis vel abrupte pedicellatis, pedicellis 1–3; foliis subabrupte acuminatis. May be new but the large fleshy corollas seem to be typical; obviously there are either more specific entities in this complex (that includes *S. triste* Jacq. of the West Indies with capitate stigmas) or fewer. F.M. Neg. 2628. Section *Leiodendron.*

San Martín: San Roque, *Williams 7330.*—Huánuco: Pillao, *Ruiz & Pavón,* type. Yanano, *3732.* Río Chinchao, *5205?* Chaglla to Muña, *Weberbauer 6709* (det. Bitter).—Junín: Vitoc, *Raimondi* (det. Werdermann).

Solanum ochrophyllum Van Heurck & M. Arg. Obs. Bot. 50. 1870.

Branchlets toward apex, solitary or geminate leaves beneath (above quite glabrous) and the several-flowered umbelliform cymes opposite them in type densely lanate- or arachnoid-tomentose with more or less fulvous trichomes; petioles 1.5–5 cm. long or longer; geminate leaves moderately unequal, all approximate, lanceolate, narrowed to base, acute, often 8–10 cm. long, half as wide; peduncles to 1 cm. long, usually shorter, pedicels about 5, to 1.5 cm. long;

calyx cupulate, coriaceous, nearly 3 mm. long, the 5 short rounded lobes broader than high, the margin cartilaginous; corolla 7 mm. long, parted nearly to base, the lobes long-oval; stamens subsessile, anthers 4 mm. long, the 2 large terminal pores promptly elongating into lateral chinks; berry 1 cm. in diameter.—Not closely allied to any species but approaches *S. nutans* R. & P. (authors); type, *Mandon 416* from Sorata, Bolivia. Apparently *S. hypomalacothrix* Bitter, Repert. Sp. Nov. 18: 70. 1922, is allied or a variant with calyx subpatelliform, the strongly apiculate lobes membranously joined below; especially interesting because the author himself assigned it to section *Anthopleuris* but remarked: gehört wohl noch zu *Leiodendron*. The Peruvian specimens (in flower) listed are less densely pubescent especially on the leaves beneath, the veins not concealed, and approach specimens of *S. nutans* R. & P. from the upper edge of its range; this southern shrub may prove to be a variant here or of *S. nutans* in which case the Bolivian plant is also perhaps another variation; the collection of the late eminent zoologist and humanist Karl P. Schmidt may become the type of *S. ochrophyllum* Van Heurck & M. Arg. var. **Schmidtii** Macbr., var. nov., foliis pedicellisque glabratis, veniis conspicue reticulatis. The specimens in early fruit already have glabrate submembranous leaves but perhaps the scant indument was due to habitat, a wet quebrada.

Ayacucho: Choimacota, *Weberbauer 7551* (var. *Schmidtii*). Above Ocros, *West 3671* (toward *S. nutans*).—Cuzco: Hacienda de Urcos, *Schmidt* (type, var. *Schmidtii*). Urubamba, *Soukup 36*. Cerro de Cusilluyoc, 3,200 meters, *Pennell 14152*. Marcapata, 2,500 meters, *Vargas 9662* (det. Standley) Calca, Prov. Anta, *Vargas 439*. Bolivia.

Solanum oppositifolium R. & P. Fl. Peruv. 2: 35, *pl. 168, fig. 8*. 1799; 137. *S. urceolatum* Pers. Syn. 1: 223. 1805?

A glabrous shrub with elliptic-oblong, acuminate leaves, acuminate to acute base, all alternate and 2–several flowered racemes borne opposite them; leaves a little undulate-repand, lustrous above, pale green, chartaceous, 1.5 dm. long, often 5–6 cm. wide, reticulate-veined, primary nerves 9 or 10, slender, prominent beneath; petioles 4–12 mm. long; peduncles 5–10 mm. long; racemes about 2 cm. long to twice as long in fruit, the pedicels 4–6 mm. long, after anthesis to 2 cm., and incrassate, especially apically; calyx 3 mm. broad, enlarging in fruit, urceolate, broadly and irregularly 5-dentate; corolla white, 8 mm. long, 1.5 cm. broad, the lanceolate-oblong lobes somewhat uncinate at tip; anthers oblong, 5 mm. long, apically

dehiscent from elongate chink, filaments very short.—Werdermann in Herb. Madrid uses the Persoon name, but it seems unnecessary to discard the cognomen of Ruiz and Pavón; simulates narrow-leaved forms of *S. dibrachiatum* Van Heurck & M. Arg. but inflorescence simple. F.M. Neg. 29729. Section *Leiodendron.*

Junín: Prov. Tarma, *Woytkowski 353* (distr. as *S. nitidum*). Chanchamayo Valley, *Schunke 258; 259; 272; 534.* Near La Merced, *5768.* San Ramón, *Williams 4545.* Vitoc, *Tafalla,* type.

Solanum oxycoccoides Bitter, Repert. Sp. Nov. 16: 14. 1919.

A small trailing slender-stemmed perennial, woody below, rooting at the nodes; pubescence of branches and leaves rather sparse, simple, the ovate leaves beneath between the veins also minutely glandular; petioles 1–3 mm. long; leaves rounded, truncate or subcordate at base, narrowed to obtuse apex, 0.5–1.5 cm. long, 3–9 mm. wide; flowers solitary, terminal, on glabrate pedicels about 6 mm. long; calyx to 8 mm. broad, the acute lobes spreading, 2–2.5 mm. long; corolla at first violet, later white, stellate, 1.5 cm. across, the lanceolate lobes about 5 mm. long, pilosulous at the little cucullate tip; filaments nearly glabrous, 1–1.3 mm. long; anthers ellipsoid, emarginate both ends, 4 mm. long, the oblique introrse pores finally somewhat laterally dehiscent; style 7–8 mm. long, obscurely papillose, incrassate to the globose-capitate stigma.—My specimen has longer petioles and larger flowers. See *S. chachapoyasense* Bitter regarding the section. F.M. Neg. 2629. Section *Anarrichomenum.*

Ancash: Near Yungay, *Weberbauer 3279,* type.—Huánuco: Chasqui, *3293.*

Solanum patellare Van Heurck & M. Arg. Obs. Bot. 53. 1870.

Shrub, sparsely to rather densely puberulent-hispidulous on the leaf-veins beneath, on the flowering branchlets and on rachis and pedicels of the short (about 1.5 cm. long) inflorescences; leaves notably thin, oblong-elliptic, all the smaller ovate (6–8 × 4.5 cm.), the larger a dm. long or longer by about 6 cm. wide, all moderately acuminate, acute at base, the petioles 8 mm. (small leaves) to 2 cm.; racemes crowded or pseudocymose, sometimes furcate; flowering pedicels 8 mm. long; calyx shallowly lobed, the broadly triangular acute teeth about 1 mm. high; petals narrowly ovate-oblong, 8 mm. long; anthers ellipsoid, 2.5 mm. long.—The Klug collections have branchlets and leaves beneath on nerves hispidulous, longer calyx

teeth and anthers and may be distinct. F.M. Neg. 22904 (*Spruce 4914*). Section *Leiodendron.*

San Martín: Tarapoto, *Spruce 4845*, type; *4914* (det. Bitter). Jepelacio near Moyobamba, *Klug 3262?*—Loreto: Florida, Río Putumayo, *Klug 2214?* (det. Standley with query, *S. pulchrum*). "Manaoey" (Klug).

Solanum patulum Pers. Syn. 1: 223. 1805; 95. *S. lanceolatum* R. & P. Fl. Peruv. 2: 33, *pl. 164.* 1799, not Cav., 1797.

A shrub or small tree to 5 meters high, young branchlets, leaves beneath and inflorescence yellowish-puberulent or subtomentose; branches flexuose, yellowish, lustrous in age; petioles about 1–2 cm. long; leaves lanceolate, glabrate and somewhat lustrous above, attenuate at base and apex, acutely acuminate, or obtuse or rounded on the lateral branchlets, mostly 1–1.5 dm. long, 2–3.5 (4.5) cm. wide; inflorescence at first terminal, subpaniculate; peduncles 1–3 cm. long; pedicels 1–2 cm. long; calyx campanulate, deeply lobed (lobes lanceolate, acute or obtuse), 6–9 mm. long; corolla violet (or pure white, forma *album* Macbr.), rotate-stellate, 1.5–2 cm. long, 4–5 cm. broad, the broad lobes abruptly acuminate; stamens nearly 2 mm. inserted above base; ovary minutely papillose (as style or this also pubescent toward base); stigma capitate (in type).—A beautiful species with an abundance of flowers, a rather light wistaria color; berry black, 1 cm. in diameter. Var. *pilosistylum* Bitter, Bot. Jahrb. 54, Beibl. 119: 9. 1916, has style pubescent and papillose toward the base, the stigma manifestly bilobed; sclerotic granules lacking. In part after Bitter, l.c. 8. Section *Dulcamara.*

Huánuco: At Muña and Tambo Nuevo, *Ruiz*, type. Tambo de Vaca, *4351; 4441* (type, forma *album*).—Huancavelica: South of Surcubamba, *Weberbauer 6477* (type, var.). Tayacaja, *Velarde Nuñez 2008.* "Urahuacta."

Solanum pseudocapsicum L. Sp. Pl. 184. 1753; 152.

A small glabrous shrub—the wood of the branches rather soft—with repand oblong-lanceolate acutely acuminate leaves about 6 cm. long and 1–1.5 cm. wide; the petioles apically alate, 6–8 mm. long; pedicels 1–3 in each axil, 6 mm. long in flower and more or less cernuose, twice as long and ascending in fruit; corolla white, 6 mm. long, 8–10 mm. broad, the calyx lobes ovate-lanceolate; anthers yellow, connivent, the oval linear cells apically dehiscent; berry red or yellow.—Spontaneous or cultivated in tropical and subtropical regions.

Illustrated, Rev. Invest. Agric. Argentina 2: 193. 1948. Section (*Pseudocapsicum*) *Leiodendron*.

Huánuco: Waste land in the pueblo Tomaiquichua, below Ambo, *2439*.

Solanum psidiifolium Rusby, Bull. Torrey Club 26: 194. 1899. *S. divernicascens* Bitter, Repert. Sp. Nov. 11: 483. 1913, fide Bitter, l.c. 16: 408. 1916. *S. Lindenii* Rusby, Mem. Torr. Bot. Club 6: 88. 1896?

Except as to type (*S. Lindenii*) branchlets (these stout) and leaves beneath more or less stellulate puberulent; leaves oval-ovate; abruptly contracted at rounded base into the broad marginal petioles (1–1.5 cm. long), subobtuse or subacute, heavy coriaceous, the slender nerves (about 12 pairs) somewhat grooved above, prominent beneath; peduncles erect, thick, to 2 cm. long; cymes more or less open, 2–3 cm. across, or larger, sometimes 25-flowered, pedicels flaccid, to 1.5 cm. long; calyx as whitish corolla fleshy, 4 mm. long, 5 mm. broad, blackish tube dark, lobes semicircular, about one-third as long; corolla stellate, 1 cm. across, the lobes ovate; style stout, angulate, exceeding stamens 1 mm.; anthers oblong, straight, 4–6 mm. long, the large elongated pores subterminal as in *S. brevipedunculatum* Rusby.—After author as to type of *S. psidiifolium*. *S. Lindenii* as to type is glabrous, leaves narrower; the later described plant may be distinct but the leaves vary in width, sometimes are inequilateral, obtuse or acute, sparingly to rather densely stellate-pubescent, cymes in short dense or longer-peduncled loose cymes (Rusby); it seems probable that these plants are part of *S. oblongum* R. & P. Stone cells of berries 2 (*S. psidiifolium*). Section *Oppositifolia*, fide Bitter, i.e. *Anthoresis*, part.

Junín: Carpapata, *Killip & Smith 24364* (det. Morton). Bolivia.

Solanum pulchrum Dunal, Syn. 15. 1816; 96. *S. pulchrum* Dunal, var. *peruvianum* Dunal in DC. Prodr. 13, pt. 1: 96. 1852.

Type with rugose terete lustrous branches 6 mm. thick; leaves geminate, or (in Peru) often alternate, lanceolate-elliptic or oblong, cuneate to petioles about 1 cm. long, reticulate-veined (primary nerves 7–9, prominent and typically puberulent beneath), the larger about 2 dm. long, 7–10 cm. wide, the smaller (sometimes absent) acute to rounded, about a fourth as large (leaves not so large in known Peruvian collections); panicles becoming lateral, to 2 dm. long and broad, often much smaller, puberulent at apex, peduncles

several cm. long, pedicels crowded, early filiform, 10–12 mm. long, in fruit 1.5–2 cm. long, a little incrassate below the globose berry, this 1 cm. in diameter; calyx subhemispheric, about 6 mm. across, semi-parted into 5 short unequal subcoriaceous lobes, sublucid at apex; corolla (1) 1.5 cm. across, the lanceolate segments acute, scarcely 5 mm. long (longer in type), twice as long as the equal stamens, anthers 5 mm. long, subcylindric-conical; style filiform, 7 mm. long, stigma subclavate.—After Dunal, the Peruvian plant not, as indicated, quite in agreement, especially in the considerably smaller flowers; here or hereabouts, may be undescribed as suggested by Morton, in herbaria is *Mexia 6338*, Pongo de Manseriche, with membranous unequal geminate leaves alately marginal to base, shortly pedunculate 1–2-forked inflorescences in axils, 3–6 cm. long, pedicels 10 mm. long. Illustrated, Mart. Fl. Bras. 6: *pl. 4, figs. 24–30.* F.M. Neg. 2843 (var.). Section *Anthoresis.*

San Martín: Pongo de Cainarachi, *Klug 2659* (distr. as *S. monadelphum*).—Loreto: Florida, mouth of Río Zubineta, *Klug 2063* (det. Morton). Puerto Arturo, Yurimaguas, *Williams 5246; Poeppig 2093* (type, var.). Pró on the Río Amazon, *Williams 1993.* Brazil.

Solanum robustifrons Bitter, Repert. Sp. Nov. 11: 473. 1912.

Stems stout, creeping and rooting below, the erect portion about 2 dm. high; petioles 5.5–7 cm. long; leaves glabrous, broadly rhombic-lanceolate, attenuate at both ends, about 2.5 dm. long, 1.5 dm. wide to at least twice larger; peduncles opposite leaves, solitary, branched, 1–1.5 cm. long, in type to 50-flowered; pedicels early 5 mm. long (slightly incrassate and 1.5 cm. in fruit); calyx lobes lanceolate, early 1.5 mm. long, in fruit 2–2.5 mm. long; corolla lobes lanceolate, acute, about 3 mm. long (to 6 mm., *Klug 3662*), a third as wide, papillose; filaments (0.6 mm. long) and style glabrous (in one example 1.2 mm. long, perhaps longer); berry globose, at least 1 cm. in diameter.—The large-flowered material may not belong here or the species is variable at least in this respect. Cf. Bitter, l.c. 17: 330. 1921; originally referred to *Polybotryon.* F.M. Neg. 33105. Section *Leiodendron.*

San Martín: Jepelacio, *Klug 3632; Klug 3491?* (peduncle long). San Roque, *Williams 6952?*—Huánuco: Tingo María, *Allard 21667* (det. with query, L. B. Smith).—Loreto: Yurimaguas, *Poeppig 2483,* type; *Killip & Smith 28032.*

Solanum salviifolium Lam. Illus. 2: 14. 1793 or 1778?; 107 (as *S. radula* Vahl., 1798). *S. citrifolium* Willd. ex Roem. & Schult. Syst.

4: 662. 1819, and HBK. Nov. Gen. & Sp. 3: 452. 1819; 109. *S. radula* Vahl. Eclog. 2: 16. 1798. *S. clathratum* Sendt. in Mart. Fl. Bras. 6: 35. 1846; 120. *S. oblitum* Dunal in DC. Prodr. 13, pt. 1: 126. 1852.

Branches slender, terete, flexuose, pulverulent-tomentose and subleprose, as the partly geminate leaves beneath and corymbs including the flowers; petioles of the larger leaves 5–8 mm. long; blades ovate-lanceolate, more or less obliquely rounded at base, acute or acuminate, green but minutely and sparsely stellulate above, the (5) 6–8 lateral nerves prominent beneath with laxly reticulate veins, mostly 8–12 cm. long, half as wide, the smaller resembling stipules 1–3 cm. long, often nearly as wide, rounded or obtuse; corymbs opposite the leaves, 1–10 cm. long, finally dichotomously branched, the cymose pedicels articulate at base, nodding before anthesis, erect in flower, 6–10 mm. long, slightly longer and somewhat arcuate in fruit; calyx cyathiform, 5-sulcate, accrescent and lacerate in fruit, the segments early ovate-crenate; corolla glabrous within, spreading or reflexed, 10–12 mm. across, the lanceolate-oblong acutely acuminate segments 6–8 mm. long; stamens equal, half as long as corolla, filaments 0.5 mm. long or minute, papillaceous, anthers connivent, 2.5 mm. long, subsagittate, dehiscing by two chinks; ovary ovoid, tomentose-villous-stellate as the filiform style at base, this somewhat curved or apically deflexed, less than twice as long as stamens, stigma depressed-capitate or punctiform; fruit about 6 mm. in diameter.—Mostly after Dunal's description of his species, which seems to represent in the Andes the plant of Lamarck and probably includes that of Willdenow. Type from Guayaquil, the specimen at Geneva indicated as *S. salviifolium* Lamarck by Bitter, who found 2–3 stone cells in *S. citrifolium*, apparently the same. Killip and Smith noted their collection as a tree 5 meters tall with white flowers, deep purple fruit. *S. distichophyllum* Sendt., l.c., of Amazonian Brazil has smaller leaves and flowers, as to type. F.M. Negs. 33059 (*S. clathratum*); 34125 (*S. oblitum*). Section *Anthoresis*.

San Martín: Tocache, *Poeppig 1891* (type, *S. clathratum*). Jepelacio, *Klug 3306* (det. Standley). Near Tarapoto, *Williams 6822*.—Huánuco: Boqueron Padre Abad, *Woytkowski 34370* (det. Cuatrecasas, *S. citrifolium*).—Junín: Pichis Trail, *Killip & Smith 26069*. To the Guianas; Cuba; Mexico.

Solanum selachophyllum Bitter, Repert. Sp. Nov. 16: 82. 1919.

A shrub or small tree to 5 meters high, well-marked by the closely bullate-stellate upper leaf-surfaces and the dense long-stipitate stel-

late reddish pubescence (2.5–3 mm. long) of the branches; petioles 1–1.5 cm. long; leaves mostly alternate, oblong-lanceolate, narrowed at each end, acute, usually about 1.5 (2) dm. long, 4–5.5 cm. wide, reticulate-veined and scabrous-stellate beneath; corymbs early terminal, shortly rusty stipitate-stellate pubescent, many-flowered; peduncles 6 dm. long, pedicels 5–8 mm. long; calyx cupulate, 4–5 mm. long, the lobes broadly triangular, acute, about 2.5 mm. long; corolla pale lilac to dark blue, stellate, nearly 2 cm. across, the lanceolate or oblong lobes to 1 cm. long, except tube (0.5 mm. long), stellate-pubescent without, below within sparsely glandular; filaments glabrous, 1.5–2 mm. long, style 4.5 mm. long, more or less pubescent nearly to stigma, this subglobose; anthers emarginate, 4 × 2 mm.; berry sparsely stellate-pubescent.—Apparently not far from some individuals of the *S. verbascifolium* L. complex, especially if this Williams plant may be correctly placed as var. **seorsum** Macbr., var. nov., foliis asperatis vix vel haud bullatis, ellipticis, 6–8 cm. latis, floribus 1.5 cm. longis (*Williams 2606*, type). Section *Anthoresis*.

San Martín: San Roque, *Williams 7470*.—Huánuco: Southwest of Monzón, *Weberbauer 3399*, type. Villcabamba, on Río Chinchao, *5196*. Toward Tingo María, *Swingle 74* (det. Morton). Carpish, 2,800 meters, *Ferreyra 2101; 2338; Ochoa 418* (det. Killip).—Junín: Oxapampa, *Soukup 2547* (det. Morton).—Loreto: La Victoria, *Williams 2606* (type, var.); *2956; 2981*. Pumayacu, *Klug 3203*.

Solanum sericeum R. & P. Fl. Peruv. 2: 33, *pl. 161*. 1799; 122.

Tall shrub with diffuse slender or filiform subterete branches, these whitish sericeous as the ovate-lanceolate leaves both sides; petioles 1 cm. long; leaves subacute, 2–2.5 cm. long, about 1 cm. wide with 5 primary nerves prominent beneath; branchlets foliose, the younger axillary; racemes laxly 2–6-flowered, 2.5–3 cm. long, the peduncles, pedicels (6–10 mm. long) and cyathiform calyx densely pubescent, the ovate-triangular lobes subobtuse; corolla violet-blue within, canescent sericeous without, 3 times longer than calyx, the ovate lobes subacutely acuminate; stamens about half as long as corolla, exceeded by filiform erect style, the stigma bifid; berry globose, red, size of a pea.—After Dunal, who saw a specimen in Paris. Type said to be imperfect (not found by me); it may be the earlier name for *S. chachapoyasense* Bitter and is one of many types that should be recollected at original locality. Section *Dulcamara*.

Junín: Huasahuasi, *Ruiz & Pavón*, type.

Solanum sessile R. & P. Fl. Peruv. 2: 35, *pl. 167, fig. a.* 1799; 98.

A glabrous shrub or small tree with sessile cuneate-oblong-spathulate leaves, mostly 2–several dm. long, and terminal corymbose racemes sometimes congested, sometimes dichotomously branched, of white flowers; leaves solitary and geminate, undulate (fleshy in my collection *4815*) and especially toward the base crisp or plicate, more or less subcordate at base, chartaceous, particularly in age noticeably reticulate-veined beneath; pedicels articulate at base, slightly incrassate at apex, 2–8 (12) mm. long; calyx firm to membranous, subhemispheric, the subrotund somewhat scarious-margined lobes unequal, 4–7 mm. long; corolla deeply parted, at least 1 cm. long, the segments ovate- or oblong-acuminate; stamens unequal, filaments all filiform, anthers linear, obtuse, subequal, dark purple (Dunal), dehiscing by 2 apical chinks; ovary ovate-connate; style capillaceous, recurving at tip, scarcely longer than stamens, the stigma punctiform; berry white.—Sometimes there are one or more stipuliform leaves; an herbarium name by me applying to specimens with capitately corymbose inflorescences is probably *S. monadelphum*, which may be only an individual variation; actually the type was only slightly open; an extreme form is the Constance and Tovar plant with much-branched inflorescence a dm. across; all the material from Junín and *Soukup 3318* have somewhat smaller flowers, leaves and more open inflorescence; the character is variable, suggesting the probable invalidity of *S. marmellosanum* Bitter. F.M. Neg. (without visible number). Section *Anthoresis*.

Huánuco: Muña, *Ruiz & Pavón*, type; *Weberbauer 6719*. Cushi, *4815*. Chinchao, *Poeppig 1554*. Pillao, *Woytkowski 34168*.—Pasco: Quillasu, *Soukup 3318* (det. Lyman Smith).—Junín: La Merced, *5443; Schunke 321; Soukup 2488*. San Ramón, *Constance & Tovar 2316*. Huacapistana, *Killip & Smith 24111; 24327* (det. Morton).—Loreto: Santa Rosa, *Killip & Smith 28992*. Yurimaguas, *Williams 4983*. Balsa Puerto, *Klug 2883* (det. Standley). San Antonio, *Killip & Smith 29492* (pedicels 1.5 cm. long). Puerto Arturo, *Williams 4983*.—Cuzco: San Miguel, Urubamba Valley, *Cook & Gilbert 1170*.—Río Acre: *Ule 9760* (det. Bitter). Adjacent Brazil.

Solanum solum Macbr., sp. nov.

Ramis (6 mm. crassis), ramulis lignosis (circa 2 mm. crassis, dm. longis), foliis praecipue subtus et floribus ubique plus minusve breviter stipitato-stellulato-hispidulis cum pilis subrubescentibus; petiolis 3–7 mm. longis; foliis geminis, oblongo-lanceolatis, majoribus ad

basin oblique acutis, acute acuminatis, 6–11 cm. longis, 2–3.5 cm. latis, minoribus suboblongis, subobtusis, 1–1.5 cm. longis, 4–7 mm. latis; floribus racemoso 1–7-umbellatis, extra-axillaribus, pedicellis 5–7 mm. longis, rufo-stellato-tomentosis, calycis dentibus rotundatis; corollae albae, laciniis oblongo-ovatis, circa 3 mm. longis; antherae crassae, apice biporosae.—The small, deeply parted flowers, few in short racemes or several in pseudo-umbels, suggest a relationship with *S. Karstenii* Dunal, 151, of Colombia.

A strict rusty pubescent shortly branched shrub about 2 meters tall that stood alone in sunny bush.

Junín: Hacienda Schunke, La Merced, *5764*, type.

Solanum styracioides Rusby, Mem. Torr. Bot. Club 4: 230. 1895.

Glabrous except for the puberulent inflorescence; woody stems flexuose, apparently reclining or supported, becoming hollow, deep purple; petioles 2–5 cm. long; leaves ovate, blunt, thin, 1–1.5 dm. long, 6–10 cm. wide; panicle terminal, 2–3 dm. long; pedicels 5–10 mm. long; calyx truncate with 5 obscure teeth; corolla velvety without, thick, divided nearly to the base into linear-lanceolate lobes; filaments very unequal, one elongating to 6 mm.; anthers densely granular, 7 mm. long; style nearly 1.5 cm. long.—Possibly a *Lycianthes* but in appearance of inflorescence and downward broadened filaments suggesting *Cyphomandra* according to the author, who proposes for it a new section, *Andropedas;* Poeppig specimen was a high-climbing shrub with a terminal panicle of large flowers, the leaves smaller than the Bolivian plant (Bitter).

San Martín: Tarapoto, (*Spruce 4327*).—Huánuco: Cuchero, *Poeppig 1533* (det. Bitter). Bolivia.

Solanum theobromophyllum Bitter, Repert. Sp. Nov. 11: 472. 1913; var. *procerius* Bitter, l.c. 12: 145. 1913.

Entirely glabrous erect half-shrub 1–2 meters high; petioles 1–3.5 cm. long; leaves broadly elliptic-lanceolate, attenuate at each end, 13–15 cm. × 5–6 cm. (or 2.5 dm. × 9–13 cm. in the typical form); inflorescence geminate at the leaf-axils, 1–1.5 cm. long; pedicels 2.5 mm. long (to 5 or 6 mm. in fruit); calyx lobes minute; flowers greenish-yellow (or white in the variety), the corolla lobes 1.3 mm. broad, about 2 mm. long, subcucullate; filaments to 0.5 mm. long, glabrous, anthers broadly ellipsoid, 1.6 mm. long, obscurely emarginate, style

2.5 mm. long, papillose below middle; berry rounded or narrowed above, tipped with a conical process.—Originally referred by author to *Polybotryon*, apparently correctly as including *Bassovioides;* determinations mostly by Morton; perhaps large-leaved specimens of *S. anceps* R. & P. F.M. Neg. 2640.

Huánuco: Tingo María, *Allard 22522* (det. L. S. Smith).—Junín: Pichis Trail, *Killip & Smith 26203*. Puerto Yessup, *Killip & Smith 26203; 26239; 26261*. Near La Merced, *Killip & Smith 23839*.—Loreto: San Antonio, *Killip & Smith 29420; 29493*. Soledad, *Killip & Smith 29584*. Yurimaguas, *Killip & Smith 29076*. Boqueron Pass, *Allard 22077*. Río Mazán, *José Schunke 280* (det. Standley, *S. anceps*). Brazil. "Muyacasacha" (Schunke).

Solanum umbellatum Miller, Gard. Dict. ed. 8, no. 27. 1768; 372. *S. dichotomum* R. & P. Fl. Peruv. 2: 34, *pl. 166b*. 1799, not Lam., 1790. *S. riparium* Pers. Enchir. 1: 221. 1805; 144. *S. rugosum* Dunal, in DC. Prodr. 13, pt. 1: 108. 1852, of Brazil, i.e. *S. asperum* Rich. at least as to Peru, both with trichomes all or mostly sessile, the latter with petioles 2–4 mm. long, but constancy of these characters is dubious over wide areas. *S. cortex-virens* Dunal, l.c. 372.

Similar to *S. verbascifolium* but greener, leaves often firmer, usually more distinctly reticulate-veined, even somewhat rugosely, and, especially, branches apically strongly stellate-tomentose, the trichomes stiped, flowers often sessile or subsessile (pedicels to 3 mm. long), indument often fulvous, denser on petals; ovary glabrous (ex char.).—It is doubtful at least as to the Peruvian specimens that this is a species distinct from *S. verbascifolium* L., probably as variable as is usually the case for widely distributed entities. The corolla is white to violet, the berry yellow, glabrate or glabrous. Plate of Ruiz and Pavón plant is poor; seemingly it is about the same as type of Miller from Mexico, at least plant of Dunal; some material determined as *S. verbascifolium* L. may rather represent this or some simulating form and many specimens distributed as *S. bicolor* Willd. seem to belong here or to *S. verbascifolium*. If pubescence characters—presence of simple trichomes, glandular, eglandular stellate trichomes, these stiped, sessile, subsessile—are consistently inherited there are many species within this circle of plants, but probably names are already available on extra-Peruvian types. Nevertheless, an unusual collection with glistening pubescence in the inflorescence (*Killip & Smith 24969*), perhaps distinct, may, for present convenience, be noted: var. **fulgens** Macbr., var. nov., foliis

fere ad basin alato-attenuatis ad apicem conspicue caudato-acuminatis, ad 6.5 dm. longis, 1 dm. latis, supra subglabris, nitidis. Section *Leiodendron* (*Anthoresis*).

San Martín: Zepelacio, *Klug 3576*.—Huánuco: Prov. Huánuco, *Ruiz & Pavón* (type, *S. dichotomum*). Villcabamba, *4981*. Pozuzo, *4657*. Cueva Grande, *4783*. Río Chinchao, *4981*. Tingo María, *Allard 22023; 20347; 20569* (det. Morton); *Soukup 2209; Stork & Horton 9600*.—Pasco: Quillasu, *Soukup 3320* (det. L. B. Smith).—Junín: Oxapampa, *Soukup 2542*. Chanchamayo, *Isern 2418*. Vitoc, *Soukup 2546*.—Loreto: Mishuyacu, *Klug 268; 2564* (det. Morton, *S. rugosum*); *Klug 568* (det. Morton); *Killip & Smith 29911*. Iquitos, *Killip & Smith 27052; 277339* (both det. Morton, *S. rugosum*, det. Standley, *S. bicolor*); *Williams 3712; 8182*. Río Nanay, *Williams 290; 744; 773; 1271; 1273*. Río Itaya, *Williams 3229*. Pró, *Williams 1967*. Caballo-cocha, *Williams 2053*. La Victoria, *Williams 2598*.—Cuzco: Valle de Cosnipata, *Nuñez 1417; 1418* (both det. Morton). Urubamba Valley, *Herrera 1558*.

Solanum verbascifolium L. Sp. Pl. 1: 184. 1753; 114. *S. bicolor* Willd. ex Roem. & Schult. Syst. 4: 661. 1819.

Shrub or tree sometimes 10 meters tall or taller, the upper branches as leaves stellate tomentose; petioles 1–7.5 cm. long; leaves entire, oval to elliptic, mostly rounded at base, acute, often 1–1.5 dm. long, 6–9 cm. wide, sometimes smaller, not infrequently larger, gray-white tomentose above to merely scabrous or glabrate, often straw-colored beneath, usually with 8 or 9 lateral nerves; terminal inflorescence ordinarily 5–10 cm. across, 1–2.5 dm. long, and 40–75-flowered, also few-flowered, becoming lateral or pseudolateral in age; pedicels finally 4–6 mm. long; calyx to 4 (–5.5) mm. long, 6–7 mm. across, the equal or unequal (*S. bicolor*) acute lobes 2.5 mm. long; corolla white or nearly, ordinarily 13–15 mm. across, the lobes 5–6 mm. long, 4–5 mm. wide; filaments nearly free, smooth, 1–1.5 mm. long, anthers 3 mm. long, 1 mm. thick, the apical pores early small; ovary typically stellate, sometimes pilose only at apex or glabrous, style subglabrous, 5–5.5 mm. long, stigma capitate; pedicels enlarged in fruit, calyx lobes 5–6 mm. long; berry 8–12 mm. thick, stellate, the many yellowish reticulate seeds accompanied by 2 stone cells.—Mostly after Bitter, Bot. Jahrb. 55: 66. 1919; the Peruvian specimens (for the most part determined by Morton) are greener above than beneath; many, at least, belong to the variant *S. auriculatum* Aiton (var. by Kuntze, subsp. by Hassler) with one or several small axillary leaves

simulating stipules, as in the similar (if distinct) *S. abutiloides* Bitt. & Lillo of Argentina; cf. Lillo, 1924. *S. bicolor* Willd. is doubtfully a true species on the basis of somewhat smaller floral parts, glabrous ovary; in view of nonconcomitance and variation of these characters probably, as *S. riparium* Pers. (*S. dichotomum* R. & P., not Lam.), belongs here if not to the doubtfully distinct *S. umbellatum* Miller. Said to be cultivated in all warmer regions as an ornamental. Illustrated, Rev. Invest. Agric. (Argentina) 2: 183 (*S. auriculatum*). Section *Anthoresis*.

Tumbez: Pampa Hospital, *Velarde Nuñez 327*.—San Martín: Tarapoto, *Williams 6193; 5671*. Juanjuí, *Klug 4238*. San Roque, *Williams 7470*.—Huánuco: Near Pampayacu, *Kanehira 97*.—Junín: Tarma, *Herrera 786*. La Merced, *Killip & Smith 23396; 23729*. Perené Bridge, *Killip & Smith 25270*. Pichis Trail, *Killip & Smith 25486*. To Argentina; West Indies; tropical Africa. "Tai mollaca," "funga" (Herrera).

Solanum xanthophaeum Bitter, Repert. Sp. Nov. 16: 401. 1920.

A shrub, type about 3 meters high, shortly yellowish-villous even to the corolla lobes without, the trichomes mostly branched; leaves (upper) geminate, the larger oblong-lanceolate, acuminate, 1–3 dm. long, 3–9 cm. wide, petioles 2–5 mm. long, the smaller sessile, broadly elliptic or suborbicular, 1–3.5 cm. long, lateral nerves 9–12; inflorescence opposite the leaves, simple, few to 17-flowered; peduncles 3–4 mm. long; pedicels 6–7 mm. long; calyx broadly campanulate, 3.5–4 mm. long, 4 mm. broad, the elliptic-lanceolate lobes about 2 mm. long; corolla white, stellate, to 12 mm. across, the broadly lanceolate lobes about 4 mm. long, nearly half as wide, cucullate; filaments 0.8 mm. long, little connate, the ellipsoid emarginate anthers 2–2.5 mm. long, style nearly straight, 5 mm. long, the clearly enlarged stigma capitate.—F.M. Neg. 2643. Section *Anthopleuris*.

Huánuco: Between Monzón and the Huallaga, *Weberbauer 3690*, type.

Section LYCIANTHES

Bitter classified the following species, Abhandl. Nat. Verh. Bremen, 24: 292–520. 1919, as comprising a genus (*Lycianthes*); however, the group can be defined with difficulty as a section, as observed by Morton, all species of *Solanum* even in Peru considered. Bitter's

account, detailed and informative, is without a key to species; his divisional key may be correct but is sometimes vague; for instance, the filaments show a range of development from subequal to more or less unequal, one or three being longer, this character sometimes intransigent; furthermore, subgenus *Eulycianthes* (Dunal) Bitter, 319, rests on the division of the drupe-like fruit into sclerotic cells, subgenus *Polymeris* (Dunal) Bitter, 331, with or without granules. Probably, as Morton observed, these are characters not taxonomically significant.

Morton, Contr. U. S. Nat. Herb. 29. 1944, presented a series of keys referring to species then known within several countries; obviously they were carefully and accurately worked out and I have largely copied from the one pertaining to Peruvian entities and devised from it a second more artificial key as a supplementary aid to identification. Many species proposed are not understood, and they may actually be variants of others or have been incorrectly limited; perhaps the precise position and characteristics of calyx lobes and pubescence as well as the obviously and variously unequal filaments should be investigated for a large series of specimens in the field as well as in the herbarium.

Trichomes at least in part stellate or furcate, often obscure, simple in *L. acutangulum*, *S. cyathocalyx*, *S. stenolobum;* filaments of last ex char. subequal or unequal.

Leaves often narrower than 2 cm. (rarely 2.5 cm.); berry 8-celled; branches often spine-tipped ..... *S. lycioides.*

Leaves usually much wider than 2.5 cm.; berry 2-celled; sometimes with several sclerotic grains; no spines.

Calyx teeth soon 4–8 mm. long.

Trichomes simple, often few or none; branchlets as leaves beneath typically soon glabrescent or glabrous; corolla to 1.5 cm. wide.

Leaves subequal, acute, to about 3 cm. wide; corolla often white ..... *S. acutangulum.*

Leaves mostly clearly unequal, subabruptly cuspidate, the larger 4–8 cm. wide; corolla violet ..... *S. stenolobum.*

Trichomes (often lacking, *S. Rantonnetii*, corolla 2–2.5 cm. wide) at least in part stellate or furcate.

Indument obscure or absent; flowers 2–2.5 cm. wide. *S. Rantonnetii.*

Indument obvious; flowers smaller.

Calyx glabrate or puberulent, teeth somewhat unequal. *S. heterochondrum.*

Calyx at least in flower densely pubescent, teeth subequal.

Leaves densely pubescent; trichomes minutely glandular..... *S. Sprucei.*

Leaves soon glabrate, eglandular..... *S. luxurians.*

Calyx teeth even in fruit to 2.5 (3) mm. long or obsolete.

Calyx teeth developed, subterete.

Trichomes, sometimes few, stellate, more or less stiped.

Leaves cuspidate, 3–6 cm. wide; trichomes stiped-stellate. *S. Poeppigii, S. glandulosum.*

Leaves subacute, 2–3 cm. wide; trichomes in part simple. *S. Jelskii.*

Trichomes simple (and furcate?); leaves acute. *S. cutacense.*

Calyx teeth obsolete..... *S. cyathocalyx.*

Trichomes simple, often conspicuous (*S. coffeifolium*, subglabrous); filaments equal.

Erect or subscandent shrubs.

Leaves strigose or villous at least midnerve beneath, sometimes sparsely; anthers free.

Calyx teeth exceeding calyx margin.

Leaves to about 5 cm. wide, often narrower; primary nerves at most 10.

Leaves, unless veins, glabrous above.

Flowers yellow (purple, Ruiz & Pavón); leaves strongly dissimilar..... *S. biformifolium.*

Flowers white; leaves subsimilar, strigose beneath. *S. lineatum.*

Leaves at least sparsely all over pubescent above.

Indument mostly appressed; leaves to 3 cm. wide.

Corolla to 2 cm. wide; pedicels usually solitary, elongate..... *S. acutifolium.*

Corolla to 1 cm. wide; pedicels 2–4, only 2–6 mm. long..... *S. brachylobum.*

Indument mostly somewhat spreading; leaves to 5 cm. wide.

Calyx teeth 5–7 mm. long.....*S. chrysothrix.*

Calyx teeth 2 mm. long.....*S. densestrigosum.*

Leaves much larger, with 12–18 nerves.

Indument appressed strigose.....*S. conspicuum.*

Indument spreading.

Calyx teeth almost capillary, 7–10 mm. long; leaves subsessile.....*S. medusocalyx.*

Calyx teeth broader, shorter; leaves petioled..*S. Ulei.*

Calyx glabrate, the teeth obsolete or obscure.

Leaves ample, many cm. long and wide.....*S. holocalyx.*

Leaves linear-lanceolate, about 1 cm. wide.*S. brachylobum.*

Leaves essentially glabrous; anthers more or less connate; calyx teeth minute.....*S. coffeifolium.*

Repent herb rooting at nodes.....*S. asarifolium.*

LYCIANTHES, VEGETATIVE KEY

Leaves strongly pubescent, with simple (rarely 1–2-forked) trichomes at least beneath even in age; leaves usually wider than 2 cm.

Calyx teeth obvious, sometimes minute.

Calyx teeth soon 4–10 mm. long, at least the longer if unequal.

Leaves often less than 5 cm. wide; nerves at most 10 pairs.

Leaves glabrous above.....*S. lineatum.*

Leaves pubescent both sides.

Trichomes simple.

Pedicels elongate; corolla 1.5–2 cm. wide.
S. chrysothrix, S. acutifolium.

Pedicels 2–6 mm. long; corolla to 1 cm. wide.
S. brachylobum.

Trichomes in part furcate.....*S. Sprucei.*

Leaves much larger, with 12–18 nerves.....*S. medusocalyx.*

Calyx teeth even in fruit only 1–3 mm. long (types).

Leaves to about 5 cm. wide; nerves about 10.

Pubescence mostly somewhat spreading..*S. densestrigosum.*

Pubescence mostly appressed.

Pedicels usually solitary, often 2 cm. long. *S. acutifolium.*

Pedicels 2–4, often 1–1.5 cm. long..... *S. cutacense.*

Leaves much wider; nerves 12–18.

Pubescence appressed, strigose..... *S. conspicuum.*

Pubescence spreading, mostly on nerves..... *S. Ulei.*

Calyx teeth obsolete; leaves ample..... *S. holocalyx.*

Leaves soon glabrate or if pubescent in age or densely the trichomes mostly furcate-stellate; leaves sometimes less than 2 cm. wide.

Leaves often much less than 2 cm. long, seldom as wide, usually oblanceolate, rarely broadly obovate, often fasciculate; trichomes if present stellate..... *S. lycioides.*

Leaves usually wider or alternate, geminate and (or) diverse, rarely long-linear-lanceolate.

Shrubs.

Calyx teeth obsolete or subspathulate or rarely 3 mm. long even in fruit.

Leaves elongate, linear-lanceolate..... *S. brachylobum.*

Leaves rather ovate.

Trichomes at least in part stellate, often minutely.

Indument stiped-stellate; leaves 3–6 cm. wide. *S. Poeppigii, S. glandulosum.*

Indument in part simple; leaves 2–3 cm. wide. *S. Jelskii.*

Trichomes if present simple.

Calyx teeth (0.5) 1–2 (3) mm. long.

Leaves subequal, glabrous or nearly. *S. coffeifolium.*

Leaves very unequal, nerves pubescent..... *S. Ulei.*

Calyx teeth obsolete.

Leaves subequal, the larger to about 1 dm. long. *S. cyathocalyx.*

Leaves unequal, the smaller stipuliform. *S. holocalyx.*

Calyx teeth soon 4 mm. long (unless *S. heterochondrum*), usually longer, narrower.

Indument obscure or lacking.

Leaves to 3 or 4 cm. wide, acute; corolla often white. *S. acutangulum.*

Leaves in part wider, cuspidate; corolla violet.
S. Rantonnetii.

Indument obvious.

Leaves subequal, little diverse.

Indument evenly distributed on leaves beneath.
S. heterochondrum.

Indument mostly on leaf-nerves beneath.

Indument usually sparse but clearly stiped-stellate.
S. luxurians.

Indument usually dense, mostly simple or trichomes furcate.....*S. Sprucei.*

Leaves very unequal and strongly diverse.

Leaves to about 1 dm. long, a third as wide; stems not strigose.....*S. biformifolium.*

Leaves often much larger; stems strigose.
S. conspicuum.

Herb, repent, rooting at nodes.....*S. asarifolium.*

Solanum acutangulum Griseb. in Lechl. Berb. Am. Aust. 58. 1857. *Lycianthes acutangula* (Griseb.) Bitter, Abhandl. Nat. Verh. Bremen 24: 357. 1920. *S. compressibaccatum* Bitter, Repert. Sp. Nov. 12: 456. 1913, fide Morton. *L. acutangula* (Griseb.) Bitter, subsp. *compressibaccata* Bitter, Abhandl. Nat. Verh. Bremen 24: 358. 1920. *L. longidentata* Bitter, l.c. 356. *S. longidentatum* (Bitter) Morton, Contr. U. S. Nat. Herb. 29: 63. 1944.

Flowering branches more or less divaricate, perhaps always scandent or supported in other shrubs, somewhat quadrate, the decurrent lines rather prominent; internodes at least 5 cm. long; petioles to 1 cm. long; leaves ordinarily geminate, glabrous or nearly except often barbellate in axils beneath, lanceolate, attenuate both ends, larger sometimes 7 or 9 cm. long, usually 2–3 cm. wide, smaller about half as large; flowers mostly 4–6, pedicels to 3 cm. long, longer in fruit; calyx tube linear-subulate, 10 teeth, the longer in fruit about 6 mm. long or longer, the shorter 4 mm. long or longer; corolla subrotate, lobes lanceolate, 3 mm. wide, glabrous except toward tip; filaments unequal, 1.5 mm. long, or longest twice as long, all glabrous; anthers 3.5–4 mm. long; berry at least in some forms (as Bitter's subspecies) compressed, 9 mm. long, 7 mm. thick, seeds as many as 39, apical granules 2.—After Bitter, mostly, for his *S. compressibaccatum;* flowers white (Ule). F.M. Neg. 2582 (*L. longidentata*).

Loreto: Cerro de Ponasa, *Ule 6800* (type, *S. compressibaccatum*). —Puno: San Govân, *Lechler 2354*, type.—Río Acre: *Ule 9733* (type of *L. longidentata*). Brazil.

Solanum acutifolium R. & P. Fl. Peruv. 2: 33, *pl. 162, fig. b.* 1799. *Lycianthes acutifolia* (R. & P.) Bitter, Abhandl. Nat. Verh. Bremen 24: 453. 1920; 182. *L. Weberbaueri* Bitter, l.c. 446. *L. tarmensis* Bitter, l.c. 451. *L. alopecoclada* Bitter, l.c. 456. *L. chrysothrix* [Poeppig] Bitter, subsp. *dolichopoda* Bitter, Repert. Sp. Nov. 18: 317. 1922.

A woody plant sometimes 2 meters tall with flexuose hispid-strigulose branches, very unequal often dissimilar, somewhat deflexing (in age) leaves more or less pubescent both sides with simple grayish-yellowish trichomes and usually solitary nodding white flowers; leaves mostly geminate, rarely ternate (the petioles 2–10 mm. long), oblong- or ovate-lanceolate, acute, to about 8 cm. long, 0.5–2.5 cm. wide, the smaller (in the upper branches) 1–2 cm. or smaller, subobtuse, primary nerves 6–8, prominent beneath; peduncles lateral and terminal, filiform, slightly incrassate above, to 2 cm. long or longer; calyx campanuliform, hispidulous, the subfiliform teeth subequal, soon 3.5–5 mm. long (about 2 mm. in flower in type); corolla white, stellate, to about 2 cm. wide, 1.5 cm. long, the 7–8 mm. long lanceolate acute lobes hispidulous; filaments 1–2 mm. long, anthers 3 (–5, Weberbauer) mm. long; berry orange.—Varieties or possibly distinct entities may be included, but more material is necessary to determine the matter; Bitter observed some 5-celled trichomes on *Poeppig 1075*, only 3-celled on at least some otherwise similar plants, and only 3- or 4-celled on *Weberbauer 7041;* the former may be part of the scarcely distinct *S. chrysothrix,* to which the first three specimens cited below are more or less aberrant intermediates. F.M. Negs. 2591 (*L. tarmensis*); 2593 (*L. Weberbaueri*).

Amazonas: Bagazan to Almirante, *Weberbauer 4452* (type, *L. Weberbaueri*).—La Libertad: Prov. Pataz, *Weberbauer 7041* (type, *L. chrysothrix,* subsp. *dolichopoda*).—Huánuco: Cuchero, *Poeppig 1075* (type, *L. alopecoclada*). Muña, *Ruiz & Pavón,* type.—Junín: Huacapistana, *Weberbauer 2141* (type, *L. tarmensis*); *Killip & Smith 24322.* Carpapata, *Killip & Smith 24394.*—Cuzco: Machupicchu, *Vargas 3348* (det. Killip, *L. reflexa* Rusby).

Solanum asarifolium Kth. & Bché. Ind. Sem. Hort. Berol. 10. 1845; Linnaea 19: 386. 1847. *Lycianthes asarifolia* (Kth. & Bché.)

Bitter, Abhandl. Nat. Verh. Bremen 24: 423. 1920. *S. chodatianum* Huber, Bol. Mus. Goeldi 4: 602, *fig. 7.* 1906, fide Morton.

A creeping stoloniferous herb, the branches, petioles, these sometimes elongate, and the subaxillary solitary 1-flowered peduncles pilose; leaves geminate, very unequal, 1 petioled, broadly or openly ovate-cordate or reniform, rounded at apex, the upper sessile, much smaller, orbicular, both glabrous except the slightly ciliate margins; flowers single, nodding, the pilosulous calyx turbinate-urceolate, truncate, 5-denticulate; corolla whitish, rotate, the 5 lobes rounded; anthers yellow, distinct; ovary and style glabrous, the latter exceeding the stamens.—This herbaceous species is readily distinguished by its creeping habit and asarum-like foliage. The similar *S. violiifolium* Schott ex Spreng., Syst. Veg. 4: 403. 1827, of Brazil has leaves deeply cordate or reniform and must be known as *S. repens* (Spreng) Dunal (*Boldon repens* Spreng, l.c. 1: 179. 1825). F.M. Neg. (sheet 602865, *S. chodatianum*).

Loreto: Contamana, *Huber 1336* (type, *S. chodatianum*).—Río Acre: *Ule 9761* (det. Bitter). Paraguay; Bolivia; Venezuela. "Tahuampa" (Huber).

Solanum biformifolium R. & P. Fl. Peruv. 2: 32, *pl. 161, fig. a.* 1799; 182. *Lycianthes biformifolia* (R. & P.) Bitter, Abhandl. Nat. Verh. Bremen 24: 443. 1920.

Shrub with erect or sprawling stems, angled branches, flexuose branchlets, these hispid with simple subappressed trichomes as the petioles (2–3 mm. long, canaliculate above, margined); peduncles solitary (Dunal), filiform, with a single flower (3–5-flowered, fide Ruiz & Pavón), 4–16 mm. long, pilose; leaves geminate, the larger ovate-oblong-lanceolate, rounded or subacute at base, acutely acuminate, about 5–10 cm. long, 2–3 cm. wide, glabrous except the obscurely hispidulous midnerve and 5–7 primary nerves beneath; the smaller leaves sessile, subcordate, suborbicular, glabrous and green above, pale and hispid on the veins and nerves beneath, 3–4 mm. long, 4–6 mm. wide, to twice as large; calyx suburceolate, more or less hispidulous, 4–5 mm. across, the subfiliform segments (5–7) 6 mm. long; corolla violet-purple (Ruiz & Pavón), the lanceolate oblong acute segments 8 mm. long; filaments 1 mm. long, anthers 2.5–2.8 mm. long; berry reddish, enclosed in the accrescent calyx.—The flowers noted as yellow by other careful collectors at Chinchao, who found it erect in undergrowth of forest or sprawling.

Huánuco: Chinchao, *Ruiz & Pavón,* type. Cushi, *4831.* Puente Durand, Río Chinchao, *Stork & Horton 9852; Mexia 8246.*

Solanum brachylobum Van Heurck & M. Arg. in Van Heurck Obs. Bot. 71. 1870. *Lycianthes brachyloba* (Van Heurck & M. Arg.) Bitter, Abhandl. Nat. Verh. Bremen 24: 457. 1920.

A shrub with shortly pubescent branches and linear-lanceolate often unequal leaves, the larger 4.5–8 cm. long, 1 cm. wide (usually narrower), narrowed to a petiole 7–8 mm. long; leaves above scarcely pubescent (trichomes simple) except on the veins; flowers 4- or 5-merous, 2–4 on pedicels 11–13 mm. long; corolla whitish, 12 mm. wide, the lobes about 6 mm. long, densely short-pilose toward the cucullate tips; filaments 1 mm. long; anthers lanceolate, 4 mm. long; calyx teeth 8 or 10, very minute, scarcely exceeding the edge of the 2–2.5 mm. long calyx cup; berry 5–6 mm. in diameter, seeds many, strongly applanate.—Distinguished readily from *L. chrysothrix* [Poeppig] Bitter by the minute calyx teeth and small leaves. F.M. Neg. 22876.

San Martín: Tarapoto, *Spruce 459*, type.

Solanum chrysothrix (Poeppig ex Bitter) Morton, Contr. U. S. Nat. Herb. 29: 67. 1944. *Lycianthes chrysothrix* [Poeppig] Bitter, Abhandl. Nat. Verh. Bremen 24: 448. 1920.

Resembles *S. acutifolium* but at least typically with more spreading and denser villous-hirsute indument, drying brownish-yellow (violet in youth), and often larger leaves but apparently these varying from 5–10 cm. long, half as wide, the smaller more or less conforming or suborbicular in the flowering branchlets as in the related species; pedicels 1–3, often 2–3 cm. long; corolla more or less pubescent with furcate (or simple) trichomes, about 1 cm. long, 1.5 cm. wide; calyx teeth capillary, densely villous, soon 5–7 mm. long, longer in fruit; filaments to 1 mm. long, anthers 3 mm. long.—In *S. acutifolium* and its segregates the smaller leaves are often suborbicular on the younger branchlets; my *3712* with leaves 5 cm. long, 2 cm. wide, suggests closely *S. acutifolium* R. & P., sens. lat.; it is doubtful if this species is distinct from the plant of Ruiz and Pavón.

Huánuco: Casapi, *Poeppig*, type. Muña, *4021*. Yanano, *3712*. Pampayacu, *Kanehira 278*.—Cuzco: Achirani, 2,750 meters, *Vargas 11152* (det. Standley).

Solanum coffeifolium (Bitter) Morton, U. S. Nat. Herb. 29: 64. 1944. *Lycianthes coffeifolia* Bitter, Abhandl. Nat. Verh. Bremen 24: 432. 1920.

A practically glabrous shrub; petioles 3–7 mm. long; larger leaves elliptic-oblong, acuminate, 1–1.5 dm. long, about a third as wide, the smaller diverse only in size; flowers 2–5, on pedicels 8–10 mm. long, in fruit 1–1.5 cm.; corolla white, to 1.5 cm. wide, the lobes 6 mm. long; filaments of yellow anthers equal; calyx teeth 10, unequal, (0.5) 1 and 1.5 mm. long to 2 mm. long in fruit; berry orange; seeds 8. —Distinguished from *L. medusocalyx* Bitter and relatives by the short calyx teeth and few seeds. In the Peruvian specimens the minute, somewhat reflexing calyx teeth are below the narrow (0.5 mm. wide) membranous or chartaceous truncate margin. The type is *Ule 9737*, Río Acre.

Huánuco: Tubumayo River, Tingo María, *Stork & Horton 9565*. —Junín: Puerto Bermudez, *Killip & Smith 26635* (det. Morton).— Loreto: Puerto Arturo, *Williams 5270*. Brazil.

Solanum conspicuum Morton, Contr. U. S. Nat. Herb. 29: 67. 1944. *Lycianthes tarapotensis* Bitter, Abhandl. Nat. Verh. Bremen 24: 440. 1920, not *S. tarapotense* Van Heurck & M. Arg., 1870.

Suffrutescent; leaves 1.5–3 dm. long, 5–15 cm. wide, very unequal, the smaller often stipuliform, 1–2 cm. long and wide or sometimes larger, pubescent beneath, as the upper branches, with long simple appressed yellowish hairs; flowers white, 2–5, on pedicels 7–10 mm. long; corolla lobes 4–4.5 mm. long; filaments about 1 mm. long, anthers 3 mm. long; calyx teeth 10, densely pubescent, 1–1.2 (3) mm. long, scarcely longer in fruit; berry dark red.—Distinguished from *L. Ulei* by the appressed pubescence. F.M. Neg. 2590 (*Ule 6483*).

San Martín: Tarapoto, *Spruce 4182*, type; *4836* (in some herb. *4830*); *Ule 6483*.—Loreto: Pongo de Manseriche, *Mexia 6347* (det. Morton).

Solanum cutacense HBK. Nov. Gen. & Sp. 3: 38. 1818; 173. *Lycianthes cutacensis* (HBK.) Macbr. Field Mus. Bot. 8: 110. 1930.

A shrub, probably scandent, with tomentose-pubescent branches and ovate acute or subacuminate leaves more or less sericeous-pilose above, canescent beneath, the trichomes typically simple; petioles 6 mm. long; leaves geminate, the larger to 5.5 cm. long, 1.5–2 cm. wide; flowers 2–3 (4), pedicels 8–15 mm. long; corolla about 1.5 cm. long, 2–3 cm. wide; filaments little unequal; calyx teeth 10, the longer 1–2 mm. long, in fruit 3 mm. long, the 5 shorter sometimes obscure. —The species is very near *S. lentum* Cav. of Mexico and northern

South America (Brazil); compare the similar *S. cyathocalyx* Van Heurck & M. Arg. and *S. Jelskii* Zahlbr.

Piura: Río Cutaco near Ayavaca, (*Bonpland*).

Solanum cyathocalyx Van Heurck & M. Arg. Obs. Bot. 65. 1870. *Lycianthes cyathocalyx* (Van Heurck & M. Arg.) Bitter, Abhandl. Nat. Verh. Bremen 24: 400. 1920.

Soon quite glabrous, only the young parts sometimes ashy pubescent with short simple trichomes; leaves geminate, more or less subequal, petioled, lanceolate-elliptic or -ovate, 5–11 cm. long and about half as broad, shortly cuspidate, the base acute; flowers in type 2–5 in sessile axillary umbels, in Weberbauer specimens also in open panicles, the filiform pedicels to 3.5 cm. long in fruit; calyx cyathiform, 2.5 mm. long, entire, rarely 1 or 2 gibbous teeth; corolla 10–12 mm. long; 2 filaments 1 mm. long, 3 about 2 mm. long, anthers 3–4 mm. long; berry 8 mm. in diameter.—An abundant white-flowered subscandent shrub, the flowering parts of the branches constantly elongating so that fruits are normally left behind to mature (usually singly) in the angles of the branches; flowers slightly irregular, as shown in the filaments (two are only 1 mm. long) and the upcurved style; cuneiform seeds wedged together to form a hard core, the seeds themselves stony in texture due to a surface layer of vertically elongated sclerotic cells (Svenson, Amer. Journ. Bot. 33: 485. 1946). Type from near Chanduy, *Spruce 6501*. The Loreto collections suggest this species as to calyx and pubescence. Illustrated, Svenson, *pl. 19, fig. 4*.

Tumbez: Granitic rocks, Quebrada Mogollon, Amotape Hills, (*Haught & Svenson 11528*). East of Hacienda Chicama, *Weberbauer 7636; 7673*.—Cajamarca: Socota to Tambillo, *Stork & Horton 10164*. —Loreto: La Victoria, *Williams 2667; 2884?* Florida, *Klug 2249?* Ecuador.

Solanum densestrigosum Bitter, Bot. Jahrb. 50, Beibl. 111: 65. 1913. *Lycianthes densestrigosa* Bitter, Abhandl. Nat. Verh. Bremen 24: 443. 1920.

A shrub with densely long strigose younger branches, rather softly yellow-strigose subequally alternate or geminate elliptic-lanceolate leaves narrowed to both ends, 11–13 cm. long, 4.5–5 cm. wide; petioles 1.5–2 (2.5) cm. long, trichomes simple, 3–4-celled; inflorescences sessile, opposite the leaves, with about 5 deeply 4- or 5-parted flowers; pedicels 3 cm. long; calyx teeth 8 or 10, subfiliform, 2 mm. long,

pubescent; corolla to nearly 2.5 cm. wide, the membranous lanceolate lobes 10–11 mm. long; stamens glabrous, equal, filaments 1.5 mm. long, anthers 3.6 mm., cordate; style 7 mm. long, stigma obtuse.—The type (Berlin-Dahlem) was without locality indication; it is doubtful if the calyx teeth are short or that the smaller leaves are constantly less dissimilar than in *S. chrysothrix* (Poeppig) Morton or *S. acutifolium* R. & P., sens. lat. F.M. Neg. 2569. Section *Polymeris*.

Peru: (*Weberbauer*, type).

Solanum glandulosum R. & P. Fl. Peruv. 2: 35, *pl. 167, fig. b.* 1799. *Lycianthes glandulosa* (R. & P.) Bitter, Abhandl. Nat. Verh. Bremen 24: 348. 1920. *S. vitocense* Dunal in DC. Prodr. 13: 176. 1852.

Shrub, often supported in other plants, the younger parts somewhat stellate-pubescent to essentially glabrous; leaves ovate-elliptic-lanceolate, cuspidately acuminate, membranous, typically pale rusty stellate-pubescent, especially beneath, the larger 7–10 cm. long or longer, about half as wide; flowers 3–6, axillary; pedicels 8–10 mm., in fruit to 2 cm. long; calyx 4.5–5 mm. long, the 10 (–12?) unequal teeth linear-oblong-spathulate, 1.5–2.5 (3) mm. long; corolla white, rotate, about 1.5 cm. long, scarcely 2 cm. wide, the lanceolate lobes glabrous or slightly stellate-puberulent; filaments 2 mm. long except one 4.5–5 mm. long; anthers 5–5.5 mm. long; berries with 2 stone cells (Bitter).—Sometimes glabrous (type) and *Klug 3991* (given an herbarium name by Standley), this possibly *S. Poeppigii*, if that is distinct; more pubescent plants simulate *S. luxurians*, with longer more slender calyx teeth; *S. hypomalacum* (Bitter) Morton of adjacent Brazil has more gradually acuminate leaves, nearly glabrous above and may be *Williams 5222* (only in bud). *Lycianthes hylophila* Bitter, l.c. 336, of Bolivia might be sought here; its leaves are mostly 3.5–5.5 cm. long, 1.5–2 cm. wide; fruit unknown. F.M. Negs. 2574; 34129 (*S. vitocense*).

San Martín: Boquerón, *Allard 21723* (det. Lyman Smith). Chazuta, *Klug 3991*. San Roque, *Williams 7330?* (calyx tube obscure).—Huánuco: Divisoria, *Woytkowski 530* (det. Cuatrecasas, *S. subinerme*); *Allard 21778* (det. Lyman Smith, *S. luxurians*). Cuchero, *Poeppig 1432*.—Junín: Vitoc, near Tarma, *Ruiz & Pavón*, type.—Loreto: Santa Rosa, *Williams 4956*. Río Mazán, *José Schunke 178*. Pucallpa, *Ferreyra 1135* (det. Morton); *4153*. Puerto Arturo, *Williams 5222?* Brazil.

Solanum heterochondrum Bitter, Bot. Jahrb. 54, Beibl. 119: 15. 1916. *Lycianthes heterochondra* Bitter, Abhandl. Nat. Verh. Bremen 24: 395. 1920.

A shrub with mostly branched pubescence especially on the young branchlets and on the young leaves beneath, the older glabrescent; petioles 7–18 mm. long; leaves ovate, subacuminate, 4.5–9.5 cm. long, 3–5.3 cm. wide, herbaceous; flowers often 2–4; pedicels about 2–2.5 cm. long, to 3 cm. in fruit; calyx rather densely pubescent with usually branched trichomes and with some minute shortly stipitate glands within; calyx teeth 10, linear, unequal, 3.5(?) and 6 mm. long; corolla white, rotate, 17–20 mm. wide, the pubescence (if present) simple; stamens nearly glabrous, about 5 mm. long, the longer filaments 1.75 mm., the shorter 0.5 mm. long; style glabrous, scarcely longer than stamens, incurved above; fruiting calyx somewhat ampliate at base; berry 11–13 mm. thick with 4–5 stone cells (2 subapical larger), about 15–22 seeds.—After author, who allied it to *S. Rantonnetii* Carr.; calyx lobes appear from scrap of type and from following material, apparently the same, to be less unequal than described. F.M. Neg. 2576.

Huánuco: Ambo, *3163?* (fruit only).—Apurímac: Lambrama, *Vargas 9802*.—Cuzco: Quillabamba, *Goodspeed Exped. 10446*.—Arequipa: Lomas de Pongo, *Velarde Nuñez 1515?* (calyx lobes short).—Puno: Sandía, (*Weberbauer 532*, type).

Solanum holocalyx (Bitter) Morton, Contr. U. S. Nat. Herb. 29: 60. 1944. *Lycianthes holocalyx* Bitter, Abhandl. Nat. Verh. Bremen 24: 459. 1920.

Subligneous, 3–6 meters tall, the upper stem, petioles (these about 1 cm. long) and leaves beneath, especially on the 13 or more prominent nerves and midnerve, more or less appressed strigose; leaves often somewhat falcate-oblong, usually about 1.5–2 dm. long, 5–10 cm. wide, acutely caudate-acuminate, the smaller stipuliform, 2–several cm. long; pedicels few to several, about 1 (–2) cm. long, little longer in fruit; calyx strigillose to glabrous, truncate, 2–2.5 (–4) mm. across, quite truncate, teeth lacking; corolla yellowish or greenish white, pubescent, 1.5–2.5 cm. across, lobes 7 mm. long (or longer); filaments subequal, 2 mm. long, anthers 3.5 mm. long; fruit dark red, about 8 mm. in diameter.—The Peruvian plant may prove to be a variant at least of the type, which was collected near Quito; specimens (except those of Mexia) determined by Morton with the

remark: it is either the same or very closely allied. Sterile specimens of this and *S. conspicuum* Morton simulate each other.

San Martín: Juanjuí, *Klug 4261*.—Huánuco: Río Cayumba, *Mexia 8259* (glabrate).—Junín: Near La Merced, *Killip & Smith 23940*. Colonia Perené, *Killip & Smith 25152*. Near Perené Bridge, *Killip & Smith 25314*. Balsapuerto, *Killip & Smith 28446; 28507; 28555; 28557; 28572*. Ecuador.

Solanum Jelskii Zahlbr. Ann. Naturh. Hofm. Wien 7: 7. 1892. *Lycianthes Jelskii* (Zahlbr.) Bitter, Abhandl. Nat. Verh. Bremen 24: 399. 1920.

Densely divaricately and furcately branched shrub, the sparse pubescence mostly simple; leaves thin, ovate or ovate-oblong, obtuse or acutish, the larger 3–5.5 cm. long; flowers 2–4, between the leaf-axils; pedicels 8–12 mm. long; calyx 3 mm. long, 10-costate, the 5 longer subulate teeth 1 mm. long, the 5 shorter often obscure; corolla violet, the lobes 10–11 mm. long; filaments unequal, two 1.5–2 mm. long, the others 3 mm. long, anthers all about 4 mm. long.—Nearly *L. cutacensis* but glabrate and calyx teeth shorter. F.M. Neg. 2580.

Cajamarca: Cutervo, *Jelski 45; 47*, type collections.

Solanum lineatum R. & P. Fl. Peruv. 2: 31, *pl. 158, fig. b.* 1799; 182. *Lycianthes lineata* (R. & P.) Bitter, Abhandl. Nat. Verh. Bremen 24: 442. 1920.

Leaves glabrous above, subappressed yellowish strigose beneath, the larger to 5 cm. wide, about twice as long, oblong- to broadly elliptic, coriaceous in age, the somewhat to much smaller similar; flowers 1 or 2, white or faintly purplish, about 7 mm. long; pedicels arcuate, in fruit 2–3.5 cm. long; calyx teeth subulate-setaceous, 2–4 mm. long or 6–8 mm. long in fruit, the latter at maturity about 1.5 cm. thick, orange.—My collections were unbranched shrubs a few dm. tall on open grassy slopes. The description in part by Bitter based on the Poeppig plate. After Ruiz and Pavón: nerves very prominent beneath, 10–12 pairs, leaves ovate, acuminate, the larger twice the size of the smaller, in plate about one-third, merely acute, in age subrevolute, glabrous above, densely hirsute beneath, younger leaves both sides; pedicels inter-axillary, one-flowered, filiform, enlarged apically, pubescent as calyx, this with 10 subulate lobes, the longer corolla white; berry included, brown.

Huánuco: Casapi, *Poeppig 1537*. Muña, *Ruiz & Pavón*, type; *3971*. Río Huallaga Canõn, *4248*.

Solanum luxurians Morton, Contr. U. S. Nat. Herb. 29: 66. 1944. *Lycianthes Pearcei* Bitter, Abhandl. Nat. Verh. Bremen 24: 355. 1920, not *S. Pearcei* Britton, 1895.

Aspect of *S. glandulosum* but with the slender longer calyx teeth of *S. Sprucei;* younger parts stipitate stellate pubescent, the indument mostly lacking in age; leaves broadly ovate, rounded at base, long-acuminate; flowers 4–6 in axils or often on short branchlets, pedicels 9–12 mm. (in fruit 10–15 mm.) long; calyx 1 cm. long, 8 mm. (in fruit 17 mm.) across, teeth alternately unequal, linear-subulate, 5–7 mm. long in flower; filaments unequal; anthers 5.5 mm. long; berry globose, scarlet, to 1.5 cm. in diameter, seeds about 40, reticulate, granules 2.—Type from Coroica, Bolivia, by Pearce. A shrub or liana with white flowers, bright orange fruit.

Loreto: Iquitos, *Killip & Smith 29849.* Mishuyacu, *Klug 1321; 1484* (det. Morton, ex char.).

Solanum lycioides L. Mant. 46. 1767; 161. *S. lycioides* L. var. *tomentosum* Dunal, Hist. Sol. 174. 1813. *S. candicans* Dunal, Sol. Syn. 23. 1816. *S. lycioides* L. var. *parvifolium* Wedd. Chloris And. 2: 107, *pl. 55.* 1857. *S. Dombeyi* Dunal in DC. Prodr. 13: 162. 1852? *Lycianthes lycioides* (L.) Hassl. Ann. Cons. Jard. Bot. Genève 20: 181. 1917; var. *brachyphylla* Bitter, Abhandl. Nat. Verh. Bremen 24: 327. 1920; subsp. *tomentosa* (Dunal) Bitter, l.c.; subsp. *parvifolia* (Wedd.) Bitter, l.c. 328. *L. candicans* (Dunal) Hassl. l.c.

Shrub, a few dm. to rarely 2 meters tall, often intricately (sometimes virgately) branched, the short branchlets frequently spine-tipped; leaves glabrous to stellate puberulent-tomentose, not unusually subfasciculate, broadly obovate- to oblong-elliptic or narrower, rarely subrotund (*S. Dombeyi*), commonly about 2–4 cm. long; flowers ordinarily bluish-violet with yellow center, the 1–3 (5) pedicels soon 1.5–2 (2.8) cm. long; calyx teeth 5 (rarely with intervening smaller teeth), (1) 2–2.5 mm. long; corolla usually about 1.5 cm. wide; filaments of red or orange anthers unequal; fruit drupiform, to 8 mm. thick with 8 sclerotically enclosed seeds.—Variable especially in leaves and degree of pubescence to complete lack; the var. *tomentosum* as to type was based on lack of spines as well as indument, a not constant concomitance; *S. Dombeyi,* found only once, may be recognizable, as suggested by Morton, Contr. U. S. Nat. Herb. 29: 56. 1929, on leaf shape, corolla 2–2.5 cm. wide, calyx teeth 1 mm. long. F.M. Neg. 25701 (*S. Dombeyi*).

Morton, l.c. 54–55, showed clearly that the characters used by Bitter to justify *Lycianthes* as a genus are invalid as they are found at random in the genus in unrelated sections; the segregate therefore, if accepted, must rest on the single character of fruit; sclerotic granules are present in *Solanum* without being tied together and, as he remarks, the character is of doubtful taxonomic significance. In 1917 Bitter himself referred to the type shrub as a *Solanum*.

Cajamarca: San Miguel to Asuncion, *Ferreyra 7084*. Huambos, Prov. Chota, *Soukup 4550; 4552* (det. Morton).—La Libertad: Trujillo to Suisicap, *Rosa Scolnik 1271*.—Ancash: Below Ocros, *Weberbauer 2743*. Lomas de la Chao, *Goodspeed Exped. 205* (det. Johnston).—Lima: Viso, *Weberbauer 126* (det. Bitter); *166*. Matucana, *332; 2890; 2948*. Surco, *Nuñez 289* (var.).—Huánuco: Near Huánuco, *2330; Ruiz & Pavón* (type, var. *tomentosum*); *Seibert 2219*. Chulque, *Mexia 04106*. Tarma to Chinchao, *Dombey 245* (type, *S. Dombeyi*).—Junín: Huancayo, *Soukup 3545*. Tarma to Palca, *Ruiz & Pavón; Weberbauer 1741;* 176. Huacapistana, *Velarde Nuñez 785* (toward *S. Dombeyi*, leaves rounded to abruptly acute base).—Ayacucho: Prov. Lucanas, *Metcalf 30304*. Puquio, *Ferreyra 5463*.—Apurímac: Oropeza Valley, *Vargas 9769*. Below Moyobamba, *West 3734* (det. Johnston). Saxaihuamán, *Herrera 846* (as *S. pseudolycioides*).—Cuzco: San Sebastian, *Pennell 13605*. Ollantaitambo, *Cook & Gilbert 284; 431A*.—Arequipa: *Munz 15496; Pennell 13183*. El Misti, *Sandeman 3810*. Above Salamanca, *Weberbauer 6855* (det. Bitter).—Puno: Near Puno, *Soukup 448*.—Tacna: (*Weddell*, type, var. *parvifolium*). To Colombia, Argentina, Chile. "Upa-ttancar," "ttitir," "ttinquir" (Herrera); "misquitlancas" (Cook); "turu cashi" (Seibert); "amacasa" (Dombey); "tin-tico" (West); "naranjito del campo" (Mexia).

Solanum medusocalyx Bitter, Repert. Sp. Nov. 12: 549. 1913. *Lycianthes medusocalyx* Bitter, Abhandl. Nat. Verh. Bremen 24: 437: 1920.

Pubescent with short and long spreading yellowish simple trichomes most numerous on the branches and larger leaf veins; leaves sessile or subsessile, very unequal, geminate, the larger broadly lanceolate, subacuminate, 1–2 dm. long, the smaller obliquely cordate-reniform, about 1 cm. long; flowers 4–9; pedicels 2–2.5 cm. long; corolla stellate, violet or lilac, about 1.5 cm. wide, pubescent, the lobes 2 mm. wide, 5 mm. long; stamens equal, the filaments glabrous, 1.5 mm. long, anthers cordate-lanceolate, 4 mm. long;

calyx teeth 10, very unequal, subulate-filiform or setaceous, 6–7 mm. long; berry red, 8 mm. thick; seeds many, small, granules absent.—The recent specimen has shortly petioled leaves, longer finely filiform calyx teeth. F.M. Neg. 2583.

Junín: Yapas, Pichis Trail, *Killip & Smith 25446* (det. Morton, with query).—Loreto: Serra de Escaler, *Ule 6804*, type.

Solanum Poeppigii (Bitter) Morton, Contr. U. S. Nat. Herb. 29: 66. 1944. *Lycianthes Poeppigii* Bitter, Abhandl. Nat. Verh. Bremen 24: 345. 1920.

Distinguished by the author from *L. glandulosa* (R. & P.) Bitter by the sparser yellowish pubescence and longer trichome stipes; pedicels 8–10 mm. long; calyx teeth 2.5–3 mm. long; fifth filament 5–5.5 mm. long, anthers 5.5–6 mm. long.—The type, as observed by Morton, has leaves glabrous above except veins, calyx teeth equal, 1 mm. long, stamens larger; the discrepancy in characters is probably close to individual variations or degree of development; if not, some of the specimens cited under *S. glandulosum* may be referable here. F.M. Neg. 23069.

Loreto: Yurimaguas, *Poeppig 2406*, type.

Solanum Rantonnetii Carr. ex Lescuyer in Hérincq, L'Hort. Franc. sér. 2, 1: 197, *pl. 16*. 1859. *Lycianthes Rantonnetii* (Carr.) Bitter, Abhandl. Nat. Verh. Bremen 24: 332. 1920.

Shrub, glabrous or nearly, with simple trichomes or these sometimes slightly branched early on leaves beneath and on margins, the stems erect from base, branched, nearly angulate, about 5 mm. in diameter below, internodes nearly 5 cm. long; petioles nearly 1–2.5 cm. long; leaves alternate or geminate, the larger mostly 5–7 cm. long, 3–4 cm. wide, to twice as large, all broadly lanceolate to rhombic-lanceolate, cuneate to base, narrowed to acute or acuminate apex or this somewhat obtuse, pale green; lateral nerves 6–8; flowers 5–7, subumbellate, pedicels 12–15 mm. long, stipitate glandular; calyx teeth linear, the 5 larger 3–4 mm. long (to 6 mm. long in fruit), the 5 smaller 1–2 mm. long or lacking; corolla violet, rotate, 2–2.5 cm. across, lobes joined nearly to the cucullate, densely pilose tip; 3 filaments 2–3 mm. long, 2 half as long, pubescent below; anthers orange, equal, 3 mm. long, style to 5 mm. long; berry subglobose, granules more than 25.—After Bitter, Repert. Sp. Nov. 12: 458. 1913. The Peruvian specimens were probably cultivated

originally; perhaps all or mostly referable to *S. acutangulum* or the similar, if distinct, *S. stenolobum*.

San Martín: Orroyo Branco, *Allard 21764*.—Lima: *Wawra 2584* (det. Killip); (*Martinet 109*).—Huánuco: Divisoria, *Allard 21336* (det. Lyman Smith); *Ferreyra 8140*. Hacienda El Aguila, near Tingo María, *Ferreyra 4178; Allard 20412; 21145; 20660A* (all det. Lyman Smith); *Stork & Horton 9466* (det. Standley, *S. stenoloba*). Tulumayo, *Ferreyra 2147*.—Cuzco: Echarate, *Goodspeed Exped. 10458* (det. Standley, *S. stenoloba*). Paraguay; Argentina; Bolivia and Brazil. "Capaicayayi" (Argentina).

Solanum Sprucei Van Heurck & M. Arg. Obs. Bot. 67. 1870. *Lycianthes Sprucei* (Van Heurck & M. Arg.) Bitter, Abhandl. Nat. Verh. Bremen 24: 380. 1920.

A shrub, the branches, at least toward the tip, densely rusty tomentose and usually glandular with simple and few to many 2–3-forked more or less stipitate trichomes intermixed; leaves softly pubescent both sides, unequal, obliquely lanceolate, acuminate, the larger 8–11 cm. long, about half as wide; flowers usually 2–3, 15–17 mm. long on pedicels soon 2 cm. long; fifth filament longer than the equal 4, anthers all 5 mm. long; calyx densely pubescent, 10–11 mm. long, the 10 subequal narrowly subulate teeth 6–8 mm. long.—F.M. Neg. 23072.

San Martín: Tarapoto, *Spruce 4352*, type. San Roque, *Williams 7135; 7653*.—Junín: Chanchamayo Valley, *Schunke 7135*. Bolivia?

Solanum stenolobum Van Heurck & M. Arg. Obs. Bot. 69. 1870. *Lycianthes stenoloba* (Van Heurck & M. Arg.) Bitter, Abhandl. Nat. Verh. Bremen 24: 358. 1920.

Branches subcylindric, slender, often tortuous, early papillose-puberulent, internodes 5–9 cm. long; petiole alate, 5 mm. long; leaves membranous, glabrous or essentially, geminate, more or less unequal, elliptic-lanceolate, the larger 5–8 cm. wide, about 1.5–2 dm. long, the smaller often 3–5 cm. wide, 4–8 cm. long, or sometimes the smaller similar to the larger; lateral nerves 9–10; flowers 1 or more on pedicels about 1.5 cm. long; calyx teeth 10, subequal, linear-subulate, about 5 mm. long, to 8 or 9 mm. in fruit; corolla violet, stellate, 2 cm. across, lobes 4 mm. wide, glandular without and puberulent, apically cucullate; filaments subequal (Bitter) or sometimes one longer(?); anthers 6.5 mm. long or longer; fruit red, subglobose or ellipsoid, 1 cm. long, seeds about 15, the 2 subapical

stone cells larger.—*S. longidentatum* (Bitter) Morton of Río Acre, probably in Peru, has filaments 0.6–1 mm. long, the fifth 2 mm. long; trichomes 2–9-celled; in *S. acutangulum* the trichomes are subequal in length. F.M. Negs. 33132; 2589 (Ule).

San Martín: Juan Guerra, *Ule 6571*, type. Tarapoto, *Spruce 4210; Williams 6541; Ule 6873*.—Ayacucho: Río Apurímac Valley, *Killip & Smith 22989*.

Solanum Ulei (Bitter) Morton, Contr. U. S. Nat. Herb. 29: 60. 1944. *Lycianthes Ulei* Bitter, Abhandl. Nat. Verh. Bremen 24: 437. 1920.

A shrub allied by author to *L. medusocalyx* Bitter but the slightly larger leaves on petioles 6–9 mm. long and the smaller obliquely ovate, 3–5 cm. long; pedicels 7–11 mm. long; calyx 3 mm. long and broad, in fruit twice as large, the teeth only 1–2 mm. long; corolla white, 1 cm. wide, the lobes 4–4.5 mm. long; filaments 0.6–0.8 mm. long, anthers 2 mm. long; seeds many, minutely reticulate.—Probably occurs within Peru; the Ecuador plant was designated subspecies *dolichodontum* Bitter, 438, calyx teeth 4–5 mm. long. F.M. Neg. 9764.

Acre District: Seringal San Francisco, *Ule 9764*, type. Ecuador.

Subgenus LEPTOSTEMONUM

The subgenus *Leptostemonum*, to which all the following species belong, is fairly well-marked by the more or less elongate and little- to long-attenuate (to tip) anthers, which are dehiscent by terminal minute or small posterior pores, or sometimes longitudinally; most plants often aculeate, not always even in the same species.—In this group, especially, occur non-fertile flowers; they are usually those with reduced style above base of inflorescence. The key obviously has been devised as an aid to determination, not to suggest relationships; thus variable or not understood species are sometimes repeated. The same intent has been promoted in the keys of the other subgenera; the exotic *S. melongena* L. and *S. giganteum* Jacq. (in the text) are omitted.

Corollas rotate-stellate, sometimes deeply parted but segments somewhat ovate or ovate-lanceolate or, if narrow, flowers small (–6 mm. long) and calyx teeth filiform.

Leaves green at least above but sometimes sparsely (minutely or coarsely) pubescent with usually (rarely simple) stellulate sessile or stiped trichomes.

Leaves at least in part pinnate or pinnately lobed, subsessile or somewhat bipinnate, or very aculeate.

Leaves petioled, aculeate; calyx lobed; leaves more or less bipinnate.....*S. concisum, S. sisymbrifolium.*

Leaves subsessile, little or not aculeate; calyx crenate.

Leaves pinnate.....*S. Barbeyanum.*

Leaves pinnately lobed or in part repand....*S. nemorense.*

Leaves entire to repandly lobed; calyx lobed or early crenate.

Leaves sessile or nearly, or, if not, usually long-attenuate to base.

Margins of large leaves spinulose or entire.*S. yapacaniense.*

Margins of small leaves repand-lobulate to entire.
S. leucopogon.

Leaves distinctly petioled, entire or rarely repand-lobulate but not or sparsely prickly.

Calyx small, the lobes rounded; leaves soon glabrous above, pallid or white tomentose beneath.

Indument compact; inflorescence pedunculate.
S. albidum.

Indument soft, open; inflorescence sessile....*S. coconilla.*

Calyx lobes acute to caudate, rarely truncate-denticulate; leaves fulvous beneath or subconcolor, often glabrate or simply pubescent or scabrous above.

Calyx 4–5 (–8) mm. long; leaves 1–2 dm. long; flowers to 1 cm. long.

Leaves acute or rounded at base.

Indument of branchlets and cymes sparse.
S. saponaceum.

Indument, at least of cymes, dense, hispid.
S. hispidum.

Leaves cordate.....*S. rhamphidacanthum.*

Calyx about 1 cm. long; leaves often 3 dm. long or longer; flowers large (except sometimes *S. Poeppigianum*).

Calyx lobes caudate, long echinate-aculeate.
S. kioniotrichum.

Calyx lobes acute, tomentose-echinate.
S. Poeppigianum, S. grandiflorum.

Leaves more or less densely pubescent above (surface, unless *S. jamaicense,* at least concealed), also beneath, unless in age, entire to repandly lobed; cf. *S. concisum; S. talarense* may be misplaced, ex char.

Flowers in sessile or subsessile lateral clusters; leaves softly pubescent above as beneath or cuneate to base.

Leaves somewhat cordate; trichomes mostly or all simple.

Calyx lobes ovate, acute, 12–15 mm. long; leaves ample.

Calyx long-pilose.....*S. quitoense.*

Calyx tomentose.....*S. topiro.*

Calyx lobes subulate-filiform or if ovate-lanceolate, acutely acuminate, shorter unless in fruit; leaves small or ample.

Prickles all fine, terete or subterete, to 6 mm. long.
S. incarceratum.

Prickles in part longer, coarser or compressed.

Branches villous as 3–7-repand-lobulate leaves.
S. mammosum.

Branches long-hirsute as angulate-repand leaves.
S. pectinatum.

Leaves cuneate at base, entire; indument stellate.
S. jamaicense.

Flowers, unless early, usually in well-peduncled inflorescences; indument at least in part forked or stellate, often stiped trichomes.

Plants sordidly tomentose; calyx teeth subulate; corolla rotate.....*S. velleum.*

Plants usually conspicuously orange or reddish stellate-tomentose.

Indument developed more or less unevenly.

Calyx lobes caudate, more or less echinate.
S. kioniotrichum.

Calyx lobes acute or mucronate, somewhat tomentose or stiped-stellate, rarely aculeate.

Flowers usually at least 2 cm. long and wide, few; leaf indument in part stellate.

Branchlets finely aculeate.....*S. talarense.*

Branchlets stellate-tomentose.....*S. grandiflorum.*

Flowers usually smaller, often many, if few, short; leaf indument above in part simple. *S. Poeppigianum.*

Indument even, short, compact, usually reddish unless leaves above in age.....*S. asperolanatum.*

Corollas at least two-thirds parted, in any case buds as segments suboblong-lanceolate (rarely narrowly ovate or ovoid), the latter usually longer than 1 cm.; filaments at most 1 mm. long, free. (Perhaps, in Peru, one collective and only two other species.)

Calyx and pedicels eglandular (typically); calyx lobes minute, erect or reflexing.

Leaves glabrous or minutely pubescent above, often in part geminate and about twice as long as wide; calyx minutely denticulate.....*S. subinerme.*

Leaves finely but clearly pubescent above, in part ternate, often suboblong, about three times longer than wide.

Calyx teeth and anthers slender.....*S. heterophyllum.*

Calyx teeth ovate, linear tips reflexing; anthers conical. *S. enoplocalyx.*

Calyx and pedicels more or less glandular; calyx lobes early distinct, except *S. torvum.*

Leaves entire or subentire, rarely repandly lobulate.

Leaves cuneate to sessile or subsessile base....*S. jamaicense.*

Leaves long-petioled.

Leaves in part ternate, suboblong.....*S. heterophyllum.*

Leaves often geminate, broadly ovate.....*S. torvum.*

Leaves pinnately lobed, very aculeate.....*S. sisymbrifolium.*

Solanum albidum Dunal, Hist. Sol. 206. 1813; 280. *S. incanum* R. & P. Fl. Peruv. 40, *pl. 175, fig. 6.* 1799, not L., 1753. *S. Mandonis* Van Heurck & M. Arg. Obs. Bot. 78. 1870 and subspecies *carabayense* Bitter, Bot. Jahrb. 50, Beibl. 111: 66. 1913. *S. macrophyllum* Dunal, l.c. 199. 1913; 347?

A shrub or tree sometimes attaining 8 meters, the stems and branches typically soon glabrous as the leaves above, but the former often sparsely spinose, the prickles broad-based especially in age; petioles terete, 2–15 cm. long, often, as the branchlets, purple,

rarely pubescent or aculeate; leaves solitary and geminate, broadly ovate-oblong, very unequal at the rounded base, entire, repand, or broadly lobed, somewhat acuminate, the larger to 5 dm. long, nearly half as wide, those on the flowering branchlets much smaller, all reticulate veiny above, strikingly and closely tomentose beneath unless the 5 or 6 primary nerves, these usually not prickly; inflorescence compound, often 5 to 10 cm. wide, the peduncles to 2 cm. long, finally glabrate as the primary branches, pedicels 6–8 mm. long, tomentose as the calyces and corollas, the former cyathiform, about 5 mm. across, 5-crenate or soon shortly 5-lobed, the lobes rounded; corolla nearly 1 cm. long, white, glabrous within, the lanceolate-acuminate segments to 6 mm. long; stamens equal, 6 mm. long; anthers fulvous below, oblong-linear with 2 apical pores; ovary nearly glabrous, style basally articulate, flexuose, pulverulent, the stigma with 2 filiform cusps; fruit globose, 6–8 mm. in diameter, finally black.—The Bolivian *S. Mandonis* Van Heurck & M. Arg. and its variety apparently represented in Peru by *West 7193* were united in Herb. Dahlem but indeed seem to differ in the more persisting pubescence on the branches, the leaves shortly aculeate on the lower portion of the midnerve beneath; probably worthy of varietal indication. *S. saponaceum* Dunal varies in much the same way. Probably the origin of the garden type of *S. macrophyllum* Dunal was Peruvian rather than Mexican and it apparently pertains to *S. albidum*. F.M. Neg. 23129 (*S. macrophyllum*).

Cajamarca: Cascas, *Raimondi* (det. Werdermann). Arenales, *Stork & Horton 10160* (det. Standley).—Huánuco: Near Huánuco, *2363; Ruiz & Pavón*, type.—Junín: San Ramón, *Constance & Tovar 2230; Killip & Smith 24745*. La Merced, *5463; Soukup 2525*. Oxapampa, *Soukup 2545*.—Ayacucho: Churubamba, *Mexia 8129* (det. Morton, *S. Mandonis*). Aína, *Killip & Smith 23126*.—Cuzco: Huadquina, *West 7193*. Machupicchu, *Herrera 3272*. Santa Ana, *Cook & Gilbert 1654*.—Puno: Sandía, *Weberbauer 582* (type, *S. Mandonis*, subsp. *carabayense*). "Anti-Christo," "yurahuacta," or "yurahuassa" (Ruiz & Pavón); "enves blanco," "huaritar" (Mexia); "espina blanca."

Solanum asperolanatum R. & P. Fl. Peruv. 2: 39, *pl. 174, fig. b*. 1799; 277. *S. asperum* Pers. Syn. 1: 229. 1805, not Vahl. *S. lanatum* Dunal, Hist. Sol. 205. 1813.

A remotely prickly (only young stems below) or smooth shrub or tree, to 10 meters tall; flowering branchlets and leaves especially

above early densely and shortly (evenly) reddish lanate with shortly stipitate and sessile or subsessile stellate trichomes; young basal or lower stems glabrous, aculeate, the upper espinose, pubescent; petioles stout, 1 cm. long; leaves ovate or elliptic-ovate, entire or subrepand or rarely shallowly lobulate, acuminate, the lower solitary, the uppermost often subgeminate, 25 cm. long, 12 cm. wide, or smaller, short stellate pubescent, somewhat denser beneath, or sparsely stellate in age, the 4–5 primary nerves more prominent below; corymbs subdichotomous, to 1 dm. long, about as wide; peduncles to 2 cm. long, pedicels approximate, 6–8 mm. long; calyx poculiform, 6 mm. across, the segments ovate, acute; corolla white, lanate without, in the type shorter than 1 cm., plicate at base, the segments lanceolate, acuminate, stellate-radiate; stamens half as long as the corolla; filaments filiform, short, the anthers oblong-acuminate, to 8 mm. long, dehiscing apically from two pores; style straight, little longer than stamens, stigma bifid; fruit yellow, the seeds lutescent.—The specimens from San Martín have smaller flowers, pubescence (in herb.) grayish. A shrub, seemingly characteristic in pubescence, has notably larger flowers, and has been referred here by Killip with doubt; it is worth-while to call it var. **Tovarianum** Macbr., var. nov., corolla 5-fida, laciniis plus minusve recurvatis, 1.5 cm. longis (type, *Metcalf 30547*). F.M. Neg. 12994.

San Martín: Juanjuí, *Klug 4258*. Morales, *Williams 5671*. San Roque, *Williams 6972*.—Huánuco: Villcabamba, Río Chinchao, *5166*. —Pasco: Quillasu, *Soukup 3323* (det. Lyman Smith).—Junín: Huasahuasi, *Ruiz & Pavón*, type; *P. C. Hutchison 1134*. Carpapata, *Killip & Smith 24389; 24427; 25761*.—Ayacucho: Ccarrapa, *Ferreyra 3740; Killip & Smith 22275* (det. Morton).—Cuzco: Huadquina, *West 7192*.—Puno: Sandía, *Metcalf 30547* (type, var. *Tovarianum*).

Solanum Barbeyanum Huber, Bol. Mus. Goeldi 4: 605. 1906.

A glabrous scandent uncinate-aculeate shrub with yellowish-green flowers distinguished from *S. nemorense* Dunal by the strictly solitary and distinctly pseudopinnate leaves; leaves geminate, the larger 4-pinnate, pinnae 1.5 dm. long, 4 cm. wide or larger, alate midrib about 2 cm. wide, the smaller usually a single pair and sometimes a terminal leaflet often only a few cm. long; flowers few, the lower falling; calyx crenate, 2.5 cm. long, 3 mm. across; corolla lobes lanceolate-acuminate, 1 cm. long, white or greenish; stamens acuminate, subequal, 5–6 mm. long; pedicels 8 mm. long in flower,

becoming 2 cm. long and conical beneath; fruit bright orange or reddish, 3 cm. in diameter.—Character doubtfully an individual variation; specimens referred by Morton to *S. megistophyllidium* Bitter, Repert. Sp. Nov. 12: 554. 1913, this with 10–15 white flowers, calyx 5 mm. across, subsessile anthers about 9 mm. long, certainly related.

Loreto: Contamana, *Huber 1335*, type. San Antonio, *Killip & Smith 29466*. Soledad, *Killip & Smith 29682; 29561*. Itaya, *Williams 3517; Killip & Smith 29466*. Brazil?

Solanum coconilla Huber, Bol. Mus. Goeldi 4: 604. 1906. *S. demerarense* Dunal, var. *inerme* Dunal in DC. Prodr. 13, pt. 1: 257. 1852.

A shrub with broadly ovate-elliptic or nearly suborbicular sinuate-angulate firm leaves (petioles 4–8 cm. long), unequal or usually subcordate at base, glabrous above, pale beneath with a loose stellate tomentum, 1–2 dm. long, often nearly as wide; cymes sessile or subsessile, pseudolateral, 5–11-flowered; calyx 3 mm. long, 4 mm. wide, minutely or obscurely denticulate, tomentose as the stout 1 cm. long pedicels and corolla without; calyx and corolla white, 9 mm. long, scarcely 1 cm. across; filaments very short; young fruits stellate tomentulose, glabrous when mature, red, at least 2 cm. in diameter.—*S. demerarense* Dunal is *S. stramonifolius* Jacq. fide Bitter in Herb. DC., surely a hasty conclusion as the East Indian species has leaves stellate above, calyx lobes 2–3 mm. long; the Peruvian shrub, however, may be only a variant of Dunal's, as he thought, but that has aculeate branches and leaves, the latter membranous, filiform pedicels, corollas 1.5 cm. across. F.M. Neg. 6812 (*Poeppig*).

Loreto: Leche, Pampa del Sacramento, (*Huber 1532*, type). Santa Ana, *Williams 1247*. Río Nanay, *Williams 435; 693*. Iquitos, *Williams 3555; Killip & Smith 27345*. Santa Rosa, *Killip & Smith 28713*. Yurimaguas, *Williams 4327; 4358*. La Victoria, *Williams 2577*. Without locality, *Poeppig 2225* (type, *S. demerarense*, var.). "Coconilla."

Solanum concisum Dunal in DC. Prodr. 13, pt. 1: 327. 1852.

Branches, at least, herbaceous, aculeate with unequal prickles 2–10 mm. long, and sericeous-velutinous with long-radiate stellate trichomes; leaves pinnatifid, the lobes sinuate-repand, aculeate on both sides and grayish-tomentose above, whitish-tomentose beneath, 7–10 cm. long; petioles stellate-hirsute and prickly, 2.5–4.5 cm. long;

peduncles 1-flowered, solitary or paired, with the calyces densely echinate with yellow prickles; calyx lobes 6, long-acuminate; calyx enlarged in fruit to nearly 2 cm. in diameter.—Perhaps distinct from *S. sisymbrifolium* Lam. in the more stellate pubescence; flower parts 6. The Metcalf specimen is so glandular that the adhering sand grains covered the stellate trichomes; its identity may be questionable, as also the type locality, perhaps a similar name in Ecuador or Mexico. F.M. Neg. 8581.

Amazonas: Chachapoyas, *Metcalf 30806* (det. Killip)?—Huánuco: Chaucha, *Ruiz & Pavón*, type. Ecuador?

Solanum enoplocalyx Dunal in DC. Prodr. 13, pt. 1: 222. 1852.

Branches flexuous, stellate-hispid, aculeate; leaves geminate or ternate, entire or repand, ovate-oblong-lanceolate or broader to about 1 dm. long, 2–3 cm. wide, greenish but stellate-pilose above, stellate-hispid beneath, the midnerve little if at all aculeate above, always beneath; peduncles lateral, 8–12 mm. long, not aculeate; racemes cymose, 4–5-flowered; pedicels subfiliform, 8–12 mm. long, aculeate; calyx stellate-tomentose with many small prickles; calyx lobes ovate, the narrow acuminate tips reflexed; corolla-lobes oblong-linear, 12–15 mm. long, about 2 mm. wide; anthers conical, 7 mm. long, the short filaments subcompressed.—The leaves are unequal, the smaller broader ones on petioles only 2–6 mm. long, the larger with petioles 1–2 cm. long. Not included by Standley in his "Shrubs and Trees of Mexico," but probably a part of *S. heterophyllum* Lam. (*S. subinerme* Jacq.) or closely allied.

Peru(?): (*Pavón*, type). Mexico?

Solanum giganteum Jacq. Coll. 4: 125. 1790; 258.

A shrub or small tree with conical tomentose prickles on the branches only; leaves elliptic-lanceolate, acute both ends, to 1.5 dm. long, about 5 cm. wide, white-tomentose beneath, early farinose but soon green and glabrous above; flowers purple, in pedunculate terminal or lateral tomentose corymbs; calyx-lobes ovate-cuneate, acute; corolla about 1 cm. broad, segments 5 mm. long, lanceolate, acuminate.—An African species, introduced into Peru—if actually collected there; the record is one of those collections in Herb. Boissier (Geneva) mislabeled simply *Pavón*, many of which are known to be species endemic to Mexico.

Peru(?): (*Ruiz & Pavón*).

Solanum grandiflorum R. & P. Fl. Peruv. 2: 35, *pl. 168, fig. b.* 1799; 338. *S. astroites* Jacq. f. Eclog. 97, *pl. 65.* 1811–1816?; 346.

Becoming a small tree with erect stout trunk, the branches abundantly foliose; petioles more or less prickly, to 6 cm. long, more or less fulvescent stellate tomentose as the leaves beneath, peduncles and few-flowered racemes, including the calyces and corolla without; leaves broadly ovate-elliptic, and somewhat sinuately repand or lobulate, strongly unequal at base, acute, often 2–3 dm. long and half as wide, the lower probably larger, in type sparsely (to densely) hispidulous above with simple trichomes, the 6–8 primary nerves prominent beneath as also the secondary; racemes 5 cm. long or longer, the flowers cymose, pedicels stout, 6–12 mm. long (2 cm. in fruit); flower bud ovate-acuminate, 2 cm. long, 1 cm. broad; calyx deeply parted, the inordinately stiped-stellate (type) to subsessile or scurfy sessile-stellate (var.) acute or subobtuse segments accrescent after anthesis; corolla blue or white, to 7 cm. across, acutely plicate in the angles, stellate, glabrous or nearly within but with a lanate oblong-lanceolate zone without about 1 cm. wide; stamens 10–12 mm. long, anthers connivent at base, violet, with 2 minute apical pores; fruit lutescent, pendent, about 5 cm. in diameter, the subtending 5-parted calyx subcampanulate.—It seems doubtful that the type actually had lanate fruit (as described but not as to plate) but the Ruiz and Pavón specimens at Berlin had a young fruit sparsely stellate, quite possibly glabrous at maturity. Corolla rich purple-blue, aging lavender-blue; fruit to 4.5 cm. in diameter (Stork & Horton). The most striking feature, apart from the size of the few flowers, is the radiate pubescent zone on the corolla segments without; rather distinctive is a less pubescent shrub which may be noted as var. **aberrans** Macbr., var. nov., foliis supra glabris; pilis plerumque sessilibus vel breviter stipitatis plus minusve cinereis (type, *Soukup 2545*). The plant of Jacquin f. described as an "annual from Chile and Peru" is possibly *S. grandiflorum.* F.M. Neg. 2607.

Huánuco: Pampayacu, *Poeppig 1243.* Cuchero, *Poeppig 1422.* Tingo María, *Soukup 2279; Stork & Horton 9461* (det. Standley); *Allard 21156; 21626* (det. Lyman Smith). Pozuzo, *4654; Ruiz & Pavón* (type, and type var.).—Pasco: Oxapampa, *Soukup 2545; 3344* (var.).—Junín: La Merced, *Soukup 2525* (var.). Puerto Yessup, *Killip & Smith 26362; 26396; 26398* (all det. Morton).—Loreto: Pucallpa, *Soukup 3035.* "Mite," "balsa" (Soukup).

Solanum heterophyllum Lam. Illus. 2360. 1793; 215. *S. asperrimum* Bitt. & Moritz, Repert. Sp. Nov. 16: 393. 1919?

Branches often purple, as the stems often somewhat glandular, toward the apex stellate-pilose and aculeate, the broad-based prickles somewhat recurved at tip, the upper 4–6 mm. long; petioles about 0.5–1.5 cm. long, the leaves opposite or ternate, more or less repand or sinuate, unequal, the larger sometimes subelliptic, all often suboblong, oblique at acute base, acute at apex, to 1 dm. long, the smaller two shortly petioled or subsessile to about 7.5 cm. and to less than 4 cm. long, these often somewhat obovate, subobtuse or even emarginate, all stellulate scabrous above, stellate tomentulose beneath, the larger sometimes sparsely aculeate with subulate straight yellowish prickles on both sides except sometimes the purple midnerve; primary nerves 2–4; cymes 2.5–5 cm. long, not or sparsely prickly, stellate-tomentose including the corollas without; calyx subscarious, poculiform, 3–4 mm. across, with 5 mucronate subtruncate or subulate teeth; corolla 2– nearly 3 cm. broad, the segments (10) 12–14 mm. long, oblong-linear, subacute, obscurely pilosulous within; stamens equal or subequal, 8–12 mm. long, the very short filaments affixed at tube apex, the slender linear equal to unequal anthers orange with a purple dorsal line, dehiscing by 2 apical pores; ovary hirsute as the straight style at base, this in fertile flowers exceeding the stamens, clavate at apex; fruit globose, yellow (Mexia), 6–8 mm. thick, the incrassate pedicels reflexed.—This is *S. heterophyllum*, probably a form of *S. subinerme* Jacq. similar to *S. juripeba* Rich. but differing in the ternately diverse leaves; strongly affine *S. Humboldtii* Dunal, 216, of Venezuela but the prickles larger, often straight, the racemes and calyx not spinose (Dunal); these are doubtfully genetic. The plant of Richard from the Surinam apparently varies in degree of prickles, these sometimes even absent, and in the size of flowers, at least according to Dunal and others. The Bitt. & Moritz plant from Venezuela, at least as to Peru, seems to be a part of the Peruvian species, which possibly is highly variable; the authers indicated no distinguishing characters. *S. myrianthum* Britton ex Rusby, Bull. Torrey Club 26: 191. 1899, type from lower Río Madre Dios, fide author is allied and to be expected within adjacent Peru, but cymes 2–3-forked, corolla lobes only 8 mm. long, anthers yellow, distinct. Mexia noted her plant was scandent in tangle, the caustic seeds used on skin spots. May be several species concerned but probably all variants of one; anthers may be equal to unequal and sometimes sublinear.

San Martín: San Roque, *Williams 7332; 7678.* Jepelacio, *Klug 3407.*—Huánuco: Divisoria, *Swingle 119; 120.* Near Tingo María,

Swingle 8. Muña, *3940.*—Junín: Chanchamayo Valley, *Schunke 136; 264; 1761.* La Merced, *5710.*—Loreto: Boquerón, *Swingle 100* (det. Morton). Itaya, *Mexia 6485* (det. Morton, *S. asperrimum*); *Williams 3448.* Hacienda Sinchoa, *Swingle 116.* French Guiana. "Ayoc mullaca" (Mexia).

Solanum hispidum Pers. Syn. 1: 228. 1815; 275. *S. stellatum* R. & P. Fl. Peruv. 2: 40, *pl. 176, fig. b.* 1799, not Jacq.; 275.

A shrub or becoming a small tree sometimes sparsely prickly on the flowering branches, these only early rusty pubescent with long stipitate and sessile or subsessile stellate trichomes, soon glabrate, the same indument densely developed on the lateral and terminal dichotomous corymbs (to 1.5 dm. wide, about 1 dm. long) including the white flowers; prickles sometimes many, on lower ligneous stems not or little enlarged, straight or nearly, 2–3 mm. long, broad at base; petioles 2–2.5 cm. long; leaves broadly ovate-elliptic, more or less oblique at the rounded-cordate base, acuminate, subentire to unevenly repand or 7–11-lobulate, sparsely (except undeveloped youngest) green both sides with only scattered or few sessile or shortly stiped stellulate trichomes, these in age asperous, especially on the upper surface; peduncles about 2 cm. long, branches to 3 cm. long, pedicels crowded, 5 mm. long (7 mm. in fruit); calyx lobes lanate-stellate in type, usually ovate, acuminate, about 6 mm. long; corolla stellate, about 1 (–1.5) cm. long, narrowed ovate lobes lanuginose stellate without, medially puberulent within; anthers violet, 5.5–6 mm. long; fruits globose, yellowish, about 1.5 cm. in diameter.—The description of Dunal included *S. Poeppigianum* Sendt., collected by Ruiz & Pavón at Muña. An exteme, perhaps distinct, is *Pennell 14066*, recordable as var. **Cerrateae** Macbr., var. nov., ramis foliisque sparse sed longe stellato-hispidis. Equally aberrant, suggesting in pubescence the unrelated *S. selachophyllum* Bitter but the broad leaves not bullate, may be noted var. **Ferreyrae** Macbr., var. nov., floribus racemosis circa 1.5 cm. latis; antheris flavis, 12 mm. longis. *Klug 3203*, type (a 6-meter tree in old clearing, corolla dark violet, anthers yellow); also apparently, *Williams 2606, 2956, 2981*, all from La Victoria on the Amazon, branchlets glabrate; this may well be an Amazonian species. F.M. Neg. 2609.

Huánuco: Panao and Pillao, *Ruiz & Pavón*, type. Southeast of Huánuco (near Panao), *2106* (det. Macbride, *S. asperolanatum*). Mito, *1485.* Near Acomayo, *Mexia 04118.* Carpish, *Stork & Horton 9886* (det. Standley, *S. saponaceum*).—Cuzco: Near Río Yana-

mayo, *Pennell 14066* (type, var.). "Huircasan" or "campucasa" (Ruiz & Pavón), "huachulla."

Solanum incarceratum R. & P. Fl. Peruv. 2: 40, *pl. 176, fig. a.* 1799; 249.

A suffrutescent or herbaceous plant 1–2 meters high, pilose even to the flowers with simple trichomes and aculeate on the stems and leaf-nerves, the prickles in part fine, in part stout; petioles to 2.5 cm. long; leaves repand-angulate, cordate, to 1.5 dm. long, nearly as wide; cymes lateral, to 5 cm. long, not prickly, the peduncles 4–6 mm. long; pedicels in flower 1–1.5 cm. long, in fruit 2 cm. long or slightly longer, strongly incrassate at apex; calyx cyathiform, the segments narrowly linear, arcuate-recurved, in anthesis only about 5 mm. long, becoming 1.5 cm. long and erect about the berry; corolla white or nearly, perhaps about 2 cm. across, the ovate-lanceolate segments acutely acuminate, spreading, finally revolute at tip, 8–10 mm. long; stamens 5, equal, two-thirds as long as the corolla, the anthers ovate-oblong, shortly attenuate, subconnivent; ovary glabrate, the filiform glabrous style longer than the stamens, straight to the didymous stigma; fruit white, to 2 cm. long, 1.5 cm. broad, glabrous, enclosed in calyx lobes.—Illustrated, Mart. Fl. Bras. *pl. 5, figs. 17–20.* F.M. Neg. 23120.

Huánuco: Yanano, *3803.* Chinchao, *Ruiz & Pavón,* type. Cassapi, *Poeppig 1659* (det. Bitter). Cuchero, *Poeppig.*—Junín: Huacapistana, *Killip & Smith 24102* (det. Morton).—Ayacucho: Aína, *Killip & Smith 22699* (det. Morton). Bolivia; Brazil.

Solanum jamaicense Miller, Gard. Dict. 8, no. 17. 1768; or Swartz, Fl. Occ. Ind. 1: 154. 1797; 199.

A sparsely prickly shrub with geminate unequal angulate-lobed broadly ovate cuneate-based leaves 1–1.5 dm. long, 6–10 cm. wide, and subsessile umbel-like lateral racemes (to 2 cm. long in fruit) of small white flowers; pubescence moderately dense, shortly stipitate-stellate, somewhat whitening the leaves beneath; pedicels in fruit to 1 cm. long; calyx segments filiform, caudate in fruit, 6–7 mm. long, usually with 1 or 2 prickles; berries 6–7 mm. in diameter, orange-red. —Determinations mostly by Standley; a common tropical weed.

Loreto: Iquitos, *Ule 6241* (det. Bitter); *Klug 335; 1204* (det. Morton); *Killip & Smith 26887; 26978; Williams 1345; 1482; 1484; 7978.* Caballo-cocha, *Williams 2180.* La Victoria, *Williams 2599.* Río Itaya, *Williams 129; 3225.* To West Indies. "Coronilla."

Solanum kioniotrichum Bitter, in herb. *S. grandiflorum* R. & P. var. *leiocarpum* Dunal in DC. Prodr. 13, pt. 1: 339. 1852.

Ut videtur ad 15 m. altum; foliis supra breviter stipitato-stellulatis vel demum aspero-hispidulis; junioribus plus minusve stipitato-setosis, lobis breviter vel longe caudatis. A shrub or small tree, sometimes coarsely spiny, the inordinately hispid-stellate branchlets and inflorescence more often sparsely, the bristle-like trichomes 3–4 mm. long, stellately branched at tip; leaves (upper) repand-margined, to few-lobulate, broadly elliptic, subsessile, the rounded base oblique, subabruptly acuminate, about 2 dm. long and 1–1.5 dm. broad, scabrous-hispid above with simple trichomes or these infrequently forked at tip, shortly grayish stellate pubescent beneath; inflorescence lateral, the several-flowered raceme early crowded but elongating as the mostly sterile flowers fall; pedicels in fruit to 8 mm. long; calyx-lobes ovate-lanceolate, caudate-tipped, 1.5 cm. long or longer including the 3–4 mm. tip, glabrous except for the bristle-like sparse to very dense stiped stellate indument, the trichomes typically 5–8 mm. long; corolla deep purple or white, the lobes ovate, acute, 2 cm. long, medially stellate-tomentose without, the corolla about 5 cm. broad; anthers 1.5 cm. long; berry subglobose, 4–5 cm. in diameter.—F.M. Negs. 2614; 33370 (var.).

San Martín: Zepelacio, *Klug 3735*.—Junín: Puerto Yessup, *Killip & Smith 26396*. Chanchamayo Valley, *Schunke 308*. Above San Ramón, *Killip & Smith 24351; Schunke 612* (type, var.).—Loreto: Iquitos or near, *Ule 6243*, type; *Killip & Smith 26905; Williams 1389; 1543; 3526; Mexia 6461* (type, var.). Balsapuerto, *Klug 3071*. Río Mazán, *José Schunke 13* (det. Standley). Yurimaguas, *Williams 4018; Poeppig 2223*. Río Nanay, *Williams 296; 435*. Pebas, *Williams 1888*. La Victoria, *2584*. Brazil. "Siucahuito" (Schunke); "simca-huito" (Quechua, Williams); "cocóna."

Solanum leucopogon Huber, Bol. Mus. Goeldi 4: 604. 1906.

Shrub or clambering, the long branches (as leaf mid-nerve beneath) aculeate with short compressed recurved prickles and hispid with long (4 mm.) spreading trichomes; leaves suboblong, long-attenuate to base, acutely acuminate, to 1.5 dm. long, 3.5–5 cm. wide, subentire to repand-lobulate, typically membranous, sparsely hispid, the trichomes on upper surface of leaves in part or both sides stellulate at least at base; flower clusters lateral or opposite leaves, subsessile or peduncles 1 cm. long in fruit, pedicels 2 cm. long; calyx lobes ovate, finely acuminate, 1 cm. long, in fruit 1.5 cm. long; corolla

about 1.5 cm. long, inordinately villous-pilose; fruits lustrous, yellow, 3 cm. in diameter.—Allied to *S. enoplocalyx* Dunal but trichomes rarely sessile, flowers 5–10, white-villous without, and calyx prickly and hispid with long trichomes that are stellate at base. If Dunal's plant is Mexican this may be distinct as a southern relative. *Mexia 6335* (in fruit) has finely stellulate puberulent leaves both sides; *Williams 1093* has firm stellulate scabrous repand leaves; there may be an earlier name for this, probably extra-Peruvian, perhaps *S. scabrum* Vahl, 216, to which the Williams and Mexia specimens could be referred except for the hispid branches, and they may be a variant of that West Indian species. F.M. Neg. (Photo by Dahlgren).

Loreto: Canchahuaya, *Huber 1370*, type. Iquitos, *Williams 8054*. La Victoria, *Williams 2652*. Leticia, *Williams 3148*. Lower Río Nanay, *Williams 517*. Pongo de Manseriche, *Mexia 6335*. Manfinfa, Río Nanay, *Williams 1093*. Brazil. "Cubunuchi," "intutuquiro" (Williams).

Solanum mammosum L. Sp. Pl. 187. 1753; 250.

A bushy subherbaceous plant a meter or so high, densely villous all over and armed on the stems and leaf-nerves with rather stout yellow prickles, many 1.5–2 cm. long; leaves roundish, 3–4 (7) -lobed or repand-dentate, sometimes 2 dm. long or longer, nearly as wide; flowers subsessile, 1–few, pink-purple; calyx lobes long-villous with articulated trichomes, not aculeate, linear, 4 mm. long; corolla to 3 cm. broad, the oblong-linear acuminate long-villous segments glabrous within, ciliate, 1–2.5 cm. long, 4 mm. wide; stamens less than half as long as corolla, filaments 1.5 mm. long, anthers rounded at base, conic-attenuate; ovary glandular punctate, glabrous, tapering into the thick style, the stigma bilobed; fruits large, yellow with white pulp, 3–6 mm. long, and purple-red punctate seeds.—*S. globiferum* Dunal, 251, known widely in cultivation, perhaps originally from Martinique, has narrowly lanceolate glandular basally aculeate calyx lobes about 5 mm. long, corolla 9–10 mm. long, fruits subglobose; *S. aculeatissimum* Jacq., 244, a West Indies species, possibly introduced, is similar but the ovate-acuminate calyx teeth are unequal, about 1.5 mm. long, aculeate; berry globose, 2–2.5 cm.

Cultivated at Hacienda Pampayacu for the poisonous fruits which were used to exterminate rats. The seeds had been obtained from plants said to be "wild" at Tingo María, Huánuco (*Raimondi*, det. Werdermann). In the Ruiz and Pavón Herbarium from Guayaquil (det. Werdermann) under name "Veneno."

Huánuco: Pampayacu, Río Chinchao, *5066.*—Loreto: Iquitos, *Raimondi; Williams 1483; 7977.* La Victoria, *Williams 2887.* Contamana, *Tessmann 3094* (det. Werdermann).—Ayacucho: Kimpitiriki, *Killip & Smith 22915* (det. Morton). Northern South America and the West Indies. "Tintoma," "roconilla dulce," "veneno."

Solanum melongena L. Sp. Pl. 186. 1753. *S. esculentum* Dunal, Hist. Sol. 208, *pl. 3.* 1813; 355.

Annual or becoming a shrub, the stems aculeate or smooth; petioles 3–3.5 (–13) cm. long; leaves weakly or not aculeate, subcordate or not, entire or lobed, grayish rough or soft stellate, 10–16 cm. long, 8–11.5 cm. wide, 5 lateral nerves; inflorescence 4–5 cm. long, 3–6-flowered, pedicels 2–3 cm. long (lowest); calyx (fertile) 1–1.5 cm. long, with 6–7 (–8) unequal lanceolate stellulate lobes, 7–8 mm. long, 3 mm. wide; corolla blue or violet (exceptionally white), campanulate, stellulate, 2–3.5 cm. long, 3.5–5 cm. across; filaments glabrous, 1–2 (–4) mm. long, the anthers 6.5–7 × 1–1.5 mm. thick, style 8–9 mm. long, two-thirds of its length stellate; pedicels in fruit 5–7 mm. long, the somewhat prickly berry sordid, white-yellow, 3–9 cm. long, 2.5–5 cm. broad or larger, the subtending calyx to 7 cm. across; the seeds reniform, 3.5 × 2.5 mm.—After Bitter; spineless or spiny in cultivation.

This vigorous annual of Asia is probably grown in Peru as in most warm countries for the flowers and the curious ornamental but not edible egg-shaped fruits.

Peru (probably in gardens and as an occasional escape). Asia.

Solanum nemorense Dunal, Hist. Sol. 194. 1813; 219. *S. laciniatum* R. & P. Fl. Peruv. 2: 40, *pl. 177, fig. a.* 1799, not Ait., 1789.

An entirely glabrous but prickly-stemmed more or less scandent shrub with very long (to 3 dm.) racemes of smooth blue or white flowers; leaves mostly geminate, unequal, sessile or nearly, the larger rarely entire, ordinarily deeply angled or acuminately and pinnately long-lobed, the opposite smaller one to about 1 dm. long, 4–4.5 cm. wide (three-fourths the size of the larger), entire or repand, all unarmed above, beneath aculeate on the midnerve; racemes cymose, nearly opposite the leaves, solitary, minutely spinulose, mostly a dm. long, some much longer, pendent in fruit, the filiform rachis cicatrose from the fallen sterile flowers, pedicels 4–6 mm. long; calyx 4 mm. across, subcyathiform, rather retusely 5-crenate; corolla white (Mexia) or blue(?), 12–14 mm. broad, the ovate-lanceolate acuminate spreading lobes 8 or 9 mm. long; stamens 8 mm. long, anthers white, basally

ovate, long-acuminate, equaling the style; ovary glabrous; stigma suborbicular, concave; berry orange, subglobose, subumbonate at base, in the enlarged calyx 3 cm. in diameter; seeds yellow.—The large yellow-orange berries are edible. The leaves are variable; many are merely lobed but the rachis of the pinnate ones is broadly winged. F.M. Neg. 2615.

Huánuco: Venenillo, 30 km. north of Tingo María, *Ferreyra 4351* (det. Morton). Cayumba, *Mexia 8304A* (det. Morton). Chinchao and Cuchero, *Ruiz & Pavón*, type; *Poeppig*.—Junín: Pichis Trail, *Killip & Smith 25531* (det. Morton).—Loreto: Balsapuerto, *Killip & Smith 28387*. Santa Rosa, *Killip & Smith 28710*. Yurimaguas, *Williams 5219; 4837; Killip & Smith 27618*.

Solanum pectinatum Dunal in DC. Prodr. 13, pt. 1: 250. 1852.

Ex char. may be (fide Dunal) similar to *S. mammosum* L. in spines (6–12 mm. long), size and shape of leaves but the pubescence harsher (hirsute), the angulate-cordate leaves to about 10-angulate-repand or -sinuate, and the very hirsute flowers subsessile, subcymose or glomerate; petioles (as aculeate branches, aculei 6–12 mm. long) densely hirsute, the strong aculei 3–4 mm. long; corolla unknown; calyx after anthesis 12 mm. long and wide, the ovate-lanceolate acutely acuminate lobes membranous, glabrate within, 6 mm. long; ovary obtuse, densely hirsute; fruit unknown.—Not seen since first draft of this account; since apparently it has not been collected again in the much collected area the label may be an error or quite possibly the specimens cited under *S. mammosum* L., at least in part, belong here.

Loreto: Yurimaguas, *Poeppig 2224*, type.

Solanum Poeppigianum Sendt. in Mart. Fl. Bras. 10: 103. 1846; 231.

Shrub with flexuose or scandent branches densely to sparsely reddish stellate-tomentose and sparsely aculeate; prickles short, recurved; petioles about 2 cm. long; leaves ovate, elliptic, usually entire, rarely lobed, around 12 cm. long and 8–10 cm. broad, green, typically appressed pubescent above (indument long simple trichomes or trichomes rarely 1–2-branched at base) or becoming glabrate, densely stellate-tomentose beneath and often remotely aculeate on the midnerve; inflorescence reddish stellate-tomentose; cymes in type terminal, about 2.5 cm. long, peduncle half as long; pedicels 2–6 mm. long, stellate-lanuginose (not prickly) as also the calyx and corolla without; calyx poculiform, 10–12 mm. broad, the ovate-lanceolate

acute segments unequal, marginally hirsute, glabrous within, to 1 cm. long, 2–4 mm. wide; corolla 5-parted, segments oblong-linear, subobtuse, glabrous within, reticulate-veined, (8) 12–14 mm. long; stamens equal, scarcely shorter than corolla, inserted at base of tube, the anthers subconic, attenuate and sublinear above, 8–10 mm. long; ovary very hirsute with long erect yellowish trichomes; style 1 cm. long, sulcate, glabrous and slightly recurved toward the bifid stigma; younger fruit hirsute, subtended by the persisting calyx.—The type has mostly stipitate-stellate trichomes, the trichome branches long and weak while the trichomes on leaves above are mostly simple or furcate; also, they are long and weak or sessile and more or less stellate at the very base; sometimes stellate, usually stiped trichomes dominate the upper side of the ovate-lanceolate leaves (entire or lobed), and the subcampanulate corollas are larger, var. **Vargasii** Macbr., var. nov., pilis plerumque stipitato-stellatis; corollis 2 cm. latis. Perhaps the species includes other varieties, more likely individual variants, especially in pubescence; type young, corolla noted by Poeppig as green, by me as greenish-yellow; these specimens have petals only 8 mm. long, stamens 5 mm. long. Perhaps the name should be restricted to this plant, using another name (by Bitter, in herbarium) for the rest. *Herrera 1799* (not seen recently) has forked racemes several cm. long, the flowers few by abortion, so may be *S. velleum* Swartz; size of flowers may be a more basic character; *Cook & Gilbert 1273*, *Soukup 538*, and *Seibert 2005* have corollas nearly as large as those of var. *Vargasii* Macbr. but pubescence in part, especially on the leaves above, is simple or mostly simple. For convenience this seemingly intermediate plant may be named var. **medians** Macbr., var. nov., corollae valde partitae, laciniis ovato-lanceolatis, 12–15 mm. longis (*Soukup 538*, type). Solution of the problem awaits determination of the genetically salient characters. F.M. Negs. 6822; 2596 (*Weberbauer 4534*).

Cajamarca: Monte Seco, Prov. Hualgayoc, *3883*.—Amazonas: Moyobamba, *Weberbauer 4534*.—San Martín: Tarapoto, *Ule 31* in part (new species in herb. by Bitter). Jepelacio, *Klug 3284* (det. Standley).—Ancash: Marcara, *Velarde Nuñez 3228*.—Lima: Río Rimac, *Soukup 3557; 1047* (toward *S. hispidum* in leaves).—Huánuco: Muña, *4083* (det. Standley); *4909;* Chavanillo, Río Marañón, *2305*. —Junín: La Oroya, *Kalenborn 147*. Chongos Bajo, *Soukup 3617*. Palca, *Velarde Nuñez 619*. Parco, near Huancayo, *West 3631* (type, var. *Vargasii*). Near Tarma, *Constance & Tovar 2212* (var. *Vargasii*); *Isern 2533; Killip & Smith 21787*.—Loreto: Yurimaguas, *Poeppig*

1231 (*2131* in Fl. Bras, type).—Huancavelica: Ancco, *Soukup 4017*. Pampas, *Stork & Horton 10257* (det. Standley).—Ayacucho: Near Huanta, *Killip & Smith 23313*.—Cuzco: Machupicchu, *Herrera 3233; 3238*. Lares Valley, *Herrera 1799*. Prov. Cuzco, near Cuzco, *Vargas 217*. Río Churumayo, *Soukup 538*. Lucumayo Valley, *Cook & Gilbert 1273*.—Madre de Dios: Maldonado, *Seibert 2005*. "Urmish" (West).

Solanum quinquangulare Willd. ex Roem. & Schult. Syst. 4: 669. 1819; 239.

Vigorous, the branchlets densely prickly with somewhat refracted very unequal slender subulate spines, the longest 6 mm. long (in Peru some 2 cm.) and in typical form also long-hirsute with simple pellucid trichomes as the petioles (to 2 cm. long) and peduncles (8–12 mm. long); leaves smooth, at the subcuneate or subtruncate base, triangular, appressed hirsute, ciliate and aculeate both sides, 1–1.5 (2) dm. long, 8–10 cm. wide, the acutely acuminate 3–5 lateral lobes divaricate, the intermediate lobe largest; cymes to 2.5 cm. long, the 4 or 5 pedicels filiform, 1 cm. long; corolla 8 mm. across, 5-parted, the narrowly oblong acute segments 8 mm. long; calyx 4 mm. broad, accrescent in fruit, the ovate lobes not aculeate; stamens two-thirds as long as corolla, filaments capillaceous, 2 mm. long, anthers ovate-lanceolate, ventricose at base, attenuate, 2-pored, about 6 mm. long; ovary glabrous, style filiform, 5–6 mm. long.—The Peruvian plant is sparsely hirsute, with much longer prickles and subcordate leaves and so it resembles *S. ciliatum* Lam., 241; otherwise it is more like the plant of Willdenow; may have been introduced.

Cuzco: Along railroad, Lucumayo, *Vargas 2788* (det. Killip). Maquina, in riverside brush, *West 8030*. Venezuela; Colombia.

Solanum quitoense Lam. Illus. 2: 16. 1797; 352. *S. angulatum* R. & P. Fl. Peruv. 2: 36, *pl. 170, fig. a*. 1799.

A very pilose-stemmed, often unarmed 1–2-meter shrub, the upper branches, leaves on both sides and racemes including the corollas in type densely and softly lanuginous; petioles 5–10 cm. long; leaves ample, the lower 4.5 dm. long and about two-thirds as wide, the upper geminate, subequal, 11–14-sinuate-lobate, mostly 1.5 dm. long, midnerve and the 5 lateral nerves obvious both sides but scarcely prominent; racemes 4–5-flowered, peduncles 6 mm. long, pedicels crowded, 1–1.5 cm. long, apically incrassate; calyx campanulate, 14–16 mm. across, the ovate-lanceolate segments acute; corolla about 2 cm.

broad, the oblong linear segments 6 mm. wide, subobtuse; anthers yellow-orange, ventricose at base, 3–4 mm. long, the 2 terminal pores minute; style filiform, scarcely longer, little clavate toward the oblique stigma; ovary subglobose, hirsute; fruit globose in size, the color and taste resembling that of citrus, the younger lanuginose, at maturity glabrous, lustrous, fragrant.—According to Feuillée, Arzn. Peru 2: 85, *pl. 46*. 1766, the flowers are white within, violet without. Supposedly native to Ecuador, the fruit is called "naranjitas de Quito." This is the var. *septentrionale* R. E. Schultes & Cuatr., Bot. Mus. Leaflets, Harvard 16: 100. 1953, devoid of spines and spinules, not known from Peru. Illustrated (the variety) photo of flower and fruit by Cuatrecasas, *pl. 17;* Schultes, l.c. 14. *pl. 10* (plant). Ruiz and Pavón noted that the fragrance and flavor of the fruits contributed to the pleasure of the mate tea. Schultes and Cuatrecasas quoted from notes of J. V. Sigvold Muller on a specimen at Kew, in part: a climber, the bright orange fruit to 5 cm. in diameter, pulp bright green, very juicy and aromatic; the pulp eaten with a little sugar is exceedingly pleasant and cooling; with seeds strained out it gives an excellent flavor to ices. The authors of the variety give a bibliography that includes a good account by Hodge, Journ. N. Y. Bot. Gard. 48: 155–157. 1947.

Amazonas: Chachapoyas, (*Mathews*).—Lima: Especially in gardens, (Feuillée); *Ruiz & Pavón; Née.*—Junín: Pichis Trail, *Killip & Smith 25783?* (leaves less pubescent).—Loreto: Cultivated at Yurimaguas, *Poeppig 2222*. Ecuador; Colombia; Venezuela. "Lulo."

Solanum rhamphidacanthum Bitter, Repert. Sp. Nov. 12: 436. 1913.

A 1–5-meter shrub apparently supported by the hooked compressed prickles (to 4 mm. long) on branches, petioles (3–5 cm. long) and leaves, especially on the midnerve beneath; pubescence, at least on the branches, consisting of long (4–5 mm.) red trichomes and some minute stellate ones, that of the leaves and inflorescence in part glandular; branches 4–5 mm. thick, internodes often 5–7 cm. long; leaves ovate-cordate, long-acuminate, about 1–1.5 dm. long, 8–12 cm. wide, the pubescence above mostly on the 7 or so lateral nerves and veins; peduncles extra-axillary, slender, 3 cm. long, the many (12) pedicels about 8 mm. long, subsecund; calyx as corolla stellate, the lanceolate acute or acuminate lobes 7–8 mm. long; corolla bright yellow-green, the subobtuse stellulate and glandular lobes 12 (–14) mm. long; stamens equal, filaments glabrous, anthers long-lanceolate,

subcordate at base, attenuate, 1 cm. long; ovary trichomes very unequal, mostly glandular, style incurved, 12 mm. long, pubescent except above with simple glandular or furcate trichomes, the stigma incrassate.—Probably occurs in adjacent Peru. F.M. Neg. 2635.

Río Acre: Seringal Auristella, *Ule 9763*, type.

Solanum saponaceum Dunal, Hist. Sol. 206. 1813; 274. *S. scabrum* R. & P. Fl. Peruv. 2: 39, *pl. 175*. 1799, not Vahl, 1796.

A shrub or small openly branched tree, sometimes 4 meters high, with smooth to more or less sparsely aculeate stems and branches; petioles 2–4 cm. long; leaves ordinarily alternate, ovate-oblong, sinuate- or angulate-lobed, rarely deeply, notably venose, often 1.5–2 dm. long, 1–1.5 dm. wide, sometimes much smaller, unequal at base, acute, usually green and soon glabrous but typically stellulate scabrous on both sides, especially above; corymbs terminal and lateral, dichotomous, sometimes a dm. wide, often much smaller, somewhat glandular puberulent, the trichomes mostly or all simple on the ascending-erect pedicels, these incrassate above, early 8–14 mm. long, to 2 cm. long in fruit; calyx cyathiform, 4–6 mm. across, the (early) narrowly ovate-lanceolate acutely acuminate lobes 3–5 mm. long, in fruit little longer but ovate at base; corolla blue or white, to about 1.5 cm. broad, 1.5–2 cm. long, deeply divided, the ovate-lanceolate apiculate segments at least 6 mm. long, 4–7 mm. wide, finely stellulate without; stamens 8 mm. long, slightly unequal, the somewhat connivent anthers oblong-ovate below, narrowed to the minute terminal pores; style longer than stamens; fruit orange, 2-celled, 12 mm. thick.—Sometimes the petioles and leaves beneath are prickly and the latter also evanescently grayish-white pubescent as in the Raimondi collection from Piura. Dunal drew his description from Ruiz and Pavón and their plate. The stamens are not equal and usually exceed 6 mm.; flowers of plants in central Peru are often somewhat smaller than those from Cuzco but not always; the leaves are variable in size, sometimes glabrous and more or less lobed in both regions, rarely almost binnate (my *5291*); inflorescences are often reduced but the rachis is ultimately racemose, sometimes nearly 1 dm. long, usually shorter even with mature fruit. It is still not certain that there is only one variable entity but it seems so to me. Probably an earlier name from one of the extra-Peruvian similar species will be shown to apply; Bitter referred *Spruce 4615* from Tarapoto to *S. caricaefolium* Rusby, Bull. N. Y. Bot. Gard. 8: 118. 1912, with the remark, "spines more numerous, longer." The fruit, like that of *S. albidum* Dunal, is saponaceous.

Piura: Chalaco, *Raimondi* (det. Werdermann, affine).—Cajamarca: Cutervo, *Raimondi* (det. Werdermann). Cajabamba, *Ferreyra 3057*. Tambillo, *Jelski 57* (det. Zahlbruckner).—San Martín: Moyobamba, *Woytkowski 35304* (det. Cuatrecasas, *S. caerulescens* Benth.). San Roque, *Williams 7263*. Tarapoto, *Williams 5509*. Rioja, *Woytkowski 5*.—Huánuco: Yanano, *3731*. Muña and Chinchao, *Ruiz & Pavón*, type. Pozuzo, *4635*. Cushi, *4823*.—Junín: La Merced, *5257; 5291; Killip & Smith 23765; 23767; Soukup 2544; 2543; 2548*. Huacapistana, *Killip & Smith 24100; 24291; Velarde Nuñez 3748* (det. Morton); *Weberbauer 2036*. Palca, *Soukup 3472*. Chanchamayo, *Schunke 543; 544*. Río Perené, *Killip & Smith 24986; 25066; 25203*. Río Pinedo, *Killip & Smith 23571*. Carpapata, *Killip & Smith 24365* (det. Morton); *3468*. *Ferreyra 3640* (det. Morton). Tarma, *Velarde Nuñez 748*. San Ramón, *Constance & Tovar 2220*.—Loreto: Río Nanay, *Williams 1131*. Iquitos, *Williams 1308*.—Ayacucho: Aína, *Killip & Smith 22556*. Ccarrapa, *Killip & Smith 23224*.—Apurímac: Abancay, *Vargas 461* (det. Standley, *S. nitidum*); *462*.—Cuzco: San Miguel, Urubamba Valley, *Cook & Gilbert 1170* (det. Morton); *Herrera 2023*. Quellomayo, Prov. Convençión, *West 8015*. Machupicchu, *Herrera 3204* (det. Standley); *3276* (det. Morton). La Maquina, *West 8029*.—Madre de Dios: Maldonado, *Seibert 2004* (det. A. C. Smith, vel aff.). Bolivia? "Casiamuru," "tululuque," "ama mullaca" (Williams).

Solanum sisymbrifolium Lam. Illus. 2: 25. 1797; 326.

The only (cf. *S. concisum*) Peruvian species prickly and viscid-villous at least in inflorescence and with pinnatifid or bipinnatifid leaves, these sometimes glabrate, the largest 3 dm. long, segments 1 dm. long, petioles 1 dm. long; a weedy plant, even the calyx often armed with yellow prickles, the lobes in fruit to 1.5 cm. long; berry finally yellow, 12 mm. in diameter; flowers white.—For an illustration of the inflorescence and fruit see Bitter, Bot. Jahrb. 55, Beibl. 121: *pl. 2*. 1917, showing the berry without markings or essentially. Probably introduced. In Bolivia called "Alco-chilco;" in the Ruiz and Pavón herbarium from Guayaquil labeled "Chancolet."

Piura: Ayavaca, (*Bonpland*).—Cajamarca: Chola and Nanchó, *Raimondi*. Huambos, *Soukup 4459* (det. R. S. Cowan).—La Libertad: *Raimondi*.—San Martín: San Roque, *Williams 7640*. Bellavista, *Ferreyra 4752*.—Loreto: Boca de Yarina, *Tessmann 3490*. Iquitos, *Killip & Smith 27095; Williams 4993; Klug 321; 957*. Yurimaguas, *Williams 4280*.—Cuzco: Echarate, *Goodspeed Exped. 10469*

(det. Standley). Santa Ana, *Cook & Gilbert 1441; 1488.* Argentina to southern United States. "Ocote mullaca," (Ferreyra), "misquicorrota" (Cook & Gilbert).

Solanum subinerme Jacq. Stirp. Amer. 50, *pl. 40, fig. 3.* 1760; 259. *S. juripeba* Rich. Act. Soc. Nat. Paris 1: 107. 1792; 214, fide Urban.

Not surely specifically distinct from *S. torvum* Sw. or at least from *S. heterophyllum* Lam.; branched, about 1 meter tall, lightly farinose tomentose above, not aculeate or sparsely; leaves oblong-ovate (broadly elliptic or ovate-elliptic in Peru), acuminate each end (in Peru acute or rounded and usually obliquely at base), entire or 3–4-repand-lobulate, glabrous above or the midnerve and 5–7 lateral nerves somewhat puberulent, often 1–2 dm. long, half as wide, more or less tomentulose or puberulent beneath; petioles often geminate, the shorter 1–1.5 cm., the longer 3–4 cm. long, the smaller leaves about a fourth as large as the opposite one; racemes 2.5–7 cm. long, lateral or axillary, pedicels early crowded, recurved to spreading-erect, finally to 2 cm. long, little incrassate; calyx lobes minute or short, ovate, obtuse; corolla purple, parted to base or nearly, the oblong lanceolate segments puberulent without, acuminate, 2–2.5 cm. long; stamens about 1.5 cm. long, filaments 0.75 mm. long, as wide as long, anthers 11–12 mm. long-attenuate; ovary pubescent, style 13–17 mm. long, stigma bilobed; berry globose, about 1 cm. thick, yellowish, perhaps also dark in color.—Very probably should include *S. heterophyllum* Lam., its leaves varying from oval to oblong but more usually geminate or ternate and pubescent above. The plant of Richard (Guiana), to which specimens have been referred, has glabrous ovary and ovate, mucronulate calyx lobes, characters probably not significant; many species exhibit variation in amount of indument (to lack) on ovary and development of calyx lobes. Allard collections det. Lyman Smith; others mostly det. Morton.

San Martín: Pongo de Cainarachi, *Klug 2725.* Toward Juanjuí, *Ferreyra 4478;* Arroyo Bravo, toward Pucallpa, *Allard 20406.*—Huánuco: Tingo María to Divisoria, *Ferreyra 977; Allard 21305; Woytkowski 34544; Swingle 8; 100; 120.*—Loreto: Prov. Coronel Portillos, *Ferreyra 4301.* Toward Pucallpa, *Ferreyra 8107.* Manfinfa, *Williams 1131.* Río Nanay, *Williams 1248.* Colombia; West Indies. "Chupusacha" (Ferreyra), "sinca-huito," "sinca-huitello" (Williams).

Solanum talarense Sven. Amer. Journ. Bot. 33: 485. 1946.

Suffruticose, the procumbent or suberect stem about half a meter long, the few branches (these 5 mm. thick) yellow, densely aculeate and pubescent; petioles to 3 cm. long, little aculeate; leaves entire, ovate, subtruncate or unequally decurrent at base, acute, 3–8 cm. long, 1–5 cm. wide, pubescent both sides with sessile stellate or simple septate and glandular stipitate trichomes; peduncles terminal(?), mostly bi-flowered (or obsolete and pedicels forked?); calyx deeply 5-lobed, aculeate; corolla greenish-yellow, 3 cm. across, deeply parted, the 5 ovate lobes 3–4 mm. wide, 8–10 mm. long, acuminate, stellate-pubescent without; filaments glabrous, 1–1.5 mm. long, hyaline-alate, anthers linear, narrowed apically, the terminal chinks finally dehiscing laterally; style filiform, 9 mm. long, glandular toward base, the stigma little larger; young fruit glandular.—Apparently resembles most the purple-flowered *S. crinitipes* Dunal, 317, of Ecuador, but entirely different in the membranous leaves and type of pubescence (Svenson); the plate shows one flower on pedicel about 1 cm. long, two flowers apparently from the same pedicel (or peduncle?); the anthers are scarcely attenuate, but minutely bipored. Illustrated, Svenson, 484, *pl. 19, fig. 3.*

Piura: Quebrada Mogollon, Amotape Hills, (*Haught & Svenson 11534*, type).

Solanum topiro HBK. Nov. Gen. & Sp. 3: 25. 1818; 353.

Type described by the collector as a much-branched unarmed shrub 2 meters high, the stem tomentose, the flowers extra-axillary, 2–several clustered; branches, leaves beneath, petioles, these nearly 4 (–12) cm. long, and flowers without stellulate-tomentose, the trichomes of the branches obviously stiped, shortly so or subsessile on the leaves and flowers; leaves pubescent above, strongly oblique at base, acutely angulate, subacute, to 3 dm. long, 2 dm. wide (to 48 × 36 cm., Schultes), with membranous appressed pilose simple or long-furcate trichomes above, reticulate-veined, the 7 primary nerves prominent beneath; pedicels about 5 mm. long; calyx deeply 5-parted, the ovate acute equal segments little shorter than the rotate corolla, this with very short tube, ovate-oblong acute somewhat unequal segments 1.5–2 cm. long; stamens 5, shorter than the corolla, subsessile, the erect oblong anthers connivent, acuminate, yellow, glabrous, the 2 subrotund pores minute; ovary ovoid-trigonous, hirsute; fruit finely tomentose, the indument caducous (Schultes), edible, the seeds sublenticular, 3–4 mm. long,

2–2.5 mm. wide (Schultes).—Type by Bonpland from the confluence of the Ríos Orinoco, Atabaju and Quariares. After writing the above an informative account by Schultes appeared, Bot. Mus. Leaflets 18: 229–244. 1958, with three excellent photographs by the author and a beautiful drawing by L. W. Smith. The author observes that the plant apparently has never been collected except about cultivated areas, often abandoned, and that the reddish ripe fruit is eaten fresh or used to make a rather acidulous beverage. Schultes quotes Fennell, For. Agric. 12: 181. 1948, ". . . . the cocona is a permanent acquisition as a valuable horticultural plant."

Loreto: In clearing, Iquitos, *Killip & Smith 27367*. Puerto Yessup, (*Killip & Smith 26363*). Puerto Arturo, (*Killip & Smith 57823*). Río Nanay, *Williams 1254*. Yurimaguas, *Killip & Smith 27999*. Caballo-cocha, *Williams 2490*. Colombia; Venezuela. "Topiro," "cocona," "coconilla," "lulo" (Colombia).

Solanum torvum Sw. Prodr. 47. 1788; 266.

Shrub or small tree (–4 meters) mostly stiped stellate-pubescent but branchlets becoming smooth; petioles 1.5–4 cm. long, usually not prickly; leaves often geminate on branchlets, ovate or oval-rhombic, acute or subcordate at base, 6.5–13.5 cm. long, 5–12.5 cm. wide or larger, repand or lobulate with 2–3 obtuse teeth, slightly rough and sordid white above, prickly or with a few prickles on midrib, rarely elsewhere; inflorescence early lateral, 2–3-forked, 50–100-flowered; pedicels 3–10 mm. long, sparsely stipitately glandular; calyx 3.5–4 mm. long, 5 mm. across, lobes apiculate, 2–3 mm. long, stellate-glandular; corolla white, stellate, 2.5 cm. across, the 5 lanceolate lobes acute or obtuse, 1 cm. long, half as wide, stellate; stamens subequal, 0.5–1 mm. above base, filaments glabrous, 1 mm. long, anthers lanceolate-ellipsoid, 6–7 mm. long, 1 mm. broad, attenuate to apical small pores; ovary globose, stellate, style 8–10.5 mm. long, curved only at tip, stigma obscurely bilobed; fruiting pedicels 15–18 mm. long, incrassate below calyx, the lobes of this 4 mm. long, 1.5 mm. wide; berry sordid yellow, 11–15 mm. thick, the many flat kidney-shaped seeds yellow-brown, reticulate, 2.5 by 2 mm.—After Urban, Symb. Ant. 6: 233. 1909, and Bitter, Bot. Jahrb. 55: 87. 1919. Apparently the Williams specimens with somewhat repand-lobulate but nearly glabrous leaves and small flowers belong here; however, they may represent *S. hyoscyamifolium* Rusby, Bull. Torrey Club 26: 190. 1899, from lower Río Madre Dios, adjacent Bolivia, the leaves green but scabrous stellate above, calyx 3–4 mm. long, corolla lobes 7 mm. long.

Loreto: Caballo-cocha, *Williams 2478; 2479.* Northern to Central America and the Caribbean; apparently also south to Bolivia.

Solanum velleum Swartz ex Roem. & Schult. Syst. 4: 643. 1819; 307. *S. leptostachys* Dunal in DC. Prodr. 13, pt. 1: 306. 1852?

A sordid or yellowish somewhat glanduliferous lanuginose-tomentose sparsely aculeate shrub, the spines on the short or elongating branches mostly compressed, those on the leaf-nerves subacicular; petioles about 2–3 cm. long; leaves solitary, ovate, rounded-subcordate at base, acute, to 7 or 8 cm. long, about half as wide, subcanescently pilose above, more tomentose beneath, with not more than 4 pairs of lateral nerves; cymes soon opposite the leaves, not aculeate, bifid, early scorpioid, finally strict, erect, elongated, the pedicels typically only a few mm. long even in fruit; calyx open-campanulate, with thin rounded sinuses between the 5 subulate teeth; corolla obtusely rotate-angulate, sericeous without, 1.5–2 cm. across; anthers oblong-lanceolate, 4 mm. long, apical pores finally extending as a chink to base; ovary pilose, style curved toward tip.—Seems to be nearer the more widely distributed *S. velleum* Sw. than the scarcely distinct segregate of Dunal, as it has the same indument, rounded calyx sinus and corolla, but it differs at least as follows and may bear the name of an enthusiastic student of the plants of his country: var. **Tovarii** Macbr., var. nov., pedicellis circa 1.5 cm. longis, demum ad 2 cm. longis, recurvatis.

Puno: North (8 km.) of Limbani, *Metcalf 30545,* type (det. Killip, *S. leptostachys,* aff.). Brazil.

Solanum yapacaniense Kuntze, Rev. Gen. 3, 2: 228. 1898.

Erect, shrubby, 1 meter high, glabrous, terete, remotely aculeate (also on midnerves), stout, straight or curved, to 7 mm. long, 3 mm. wide at base; leaves entire or remotely spinulose dentate, lanceolate, attenuate to sessile base, to 3 dm. long, half as wide; peduncles opposite leaves, aculeate, to 6 cm. long; flowers 3–8, approximately racemose; calyx cyathiform, 3 mm. wide, 2 cm. long, with 5 broad acute lobes; corolla white, 5-parted, to 1 cm. long, the segments oblong-lanceolate; stamens equal, shorter than corolla, anthers acuminate, 3 times longer than filaments; style long as stamens, stigma obtuse, ovary globose.—Near *S. lancifolium* Jacq., larger leaves, small, aculeate inflorescence (author), but in Peru at least resembles most *S. nemorense* Dunal but the remotely aculeate leaves larger, corolla greenish-white or yellowish, fruit bright orange, to about 4

cm. in diameter, the light brown reniform seeds about 5 mm. long (Peruvian specimens); perhaps it will prove to be a variant of Dunal's species. Type from Río Yapacaní, Bolivia, at 400 meters. Determinations by Morton.

San Martín: San Roque, *Williams 6951*.—Junín: Dos de Mayo, Pichis Trail, *Killip & Smith 25854*.—Ayacucho: Kimpitiriki, *Killip & Smith 23019*.—Loreto: Balsapuerto, *Killip & Smith 23019*.

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